A COMPARISON OF GROUND AND AERIAL APPLICATION AT THE UNION CAMP SOUTHERN STATES LOBLOLLY PINE SEED ORCHARD

CLAXTON, GA

AUGUST 20-22, 1991

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Forest Pest Management
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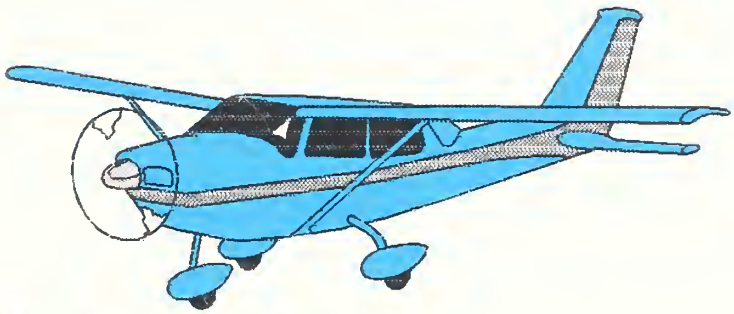

A COMPARISON OF GROUND AND AERIAL APPLICATION AT THE UNION CAMP SOUTHERN STATES LOBLOLLY PINE SEED ORCHARD CLAXTON, GA AUGUST 20-23, 1991

Larry R. Barber[1], and Alex Mangini[2]

Introduction

Production of superior seed is of vital concern to federal, state, and private timber interests. Across the South there are nearly 10,000 acres of improved seed orchards which are treated annually with insecticides applied with either aircraft or ground sprayers. This project evaluated deposition and spray drift from both a Cessna Ag truck fixed wing airplane and a FMC Model 757 ground airblast sprayer. This project adds to the database of spray technology for ground based sprayer applications in coniferous seed orchards.

In 1980 a series of test sprays was conducted on the Withlacoochee Seed Orchard near Brooksville, FL (Barry et. al. 1980, Barry et. al. 1982, Barry et. al. 1983, and Barry et. al. 1984). These tests determined the feasibility of applying pesticides with aircraft. Water and dye were aerially applied with a Hughes 500C helicopter. Needle samples of slash and Ocala sand pine taken following aerial application contained more deposition on the upper crown than on the lower crown (Barry et. al. 1981). Also, aircraft spray drift was measured downwind 436 ft (133 m) with winds of 6-16 mi/h. Airblast sprayers were also tested. Deposition was equal to or greater than the helicopter tested. The report stated that ground sprayers "will provide adequate spray coverage of southern pines ranging in height below 50 feet" (15.2 m).

Additional aerial application spray evaluations using azinphos-methyl and fenvalerate at Washington, NC and DeRidder, LA, were successful in controlling seed and cone insects aerially (Barber and Leonard 1985, and Weatherby and Overgaard 1982). The average amount of spray reaching the orchard floor ranged from 55 to 58 drops/cm^2 when the total solution applied by helicopter was 10 gal/acre. Penetration of this spray through the canopy ranged from 3.9 to 9.3 gal/acre (Barber and Leonard 1985).

Other spray drift studies in seed orchards have provided managers a framework for estimating drift from aerially treating a seed orchard. Drift was deposited up to 60 m downwind of seed orchards in flat terrain and was about 8 percent of the amount deposited in the treated area (Barry, J. W. et. al. 1983). At Washington, NC spray drift deposits were detected 60 m downwind and they ranged from 0.3 to 2.7 drops/cm^2. Drift can be detected downwind at least 100 m and large amounts of spray are deposited within a 15 m zone surrounding orchards.

By 1987 nearly 80 percent of all orchards were applying pesticides by aircraft only. In this survey of southern pine orchards, droplet size ranged from 385 to 1446 microns VMD. The recommended VMD droplet size is 350 microns (Barber and Fatzinger 1987).

Objectives

The objective of this spray evaluation was to compare spray deposition and drift between ground spray and aircraft application to a loblolly pine seed orchard.

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Materials and Methods

Scope

This cooperative project between the USDA Forest Service and Union Camp Corporation was conducted on the Union Camp Southern States Orchard Complex near Claxton, GA August 20-22, 1991. There were two trials each morning which compared aerial and ground application.

Site Description

The orchard is located 4.5 mi south and west of Claxton, GA. The surrounding area is flat woodlands belonging primarily to Union Camp Corporation with small inholdings of private land. The Southern States Orchard complex contains both one and one-half generation and second generation superior loblolly and slash pine trees. The orchard tree spacing is 22 x 22 ft (6.7m)and the orchard complex contains both loblolly and slash pine. The 8.9 acre Alabama rust resistant loblolly pine source on the Southern States Seed Orchard (Figure 1) was chosen for this study. The trees selected for this study ranged from 31-67 ft in height (9.4 - 20.4 m).

Meteorological Measurement

Meteorological measurements were made with 1) a Handar 540A on a 22 ft (6.7 m) tower located near the center of the spray block, 2) another Handar 540A on a 55 foot (16.8 m) tower located 600 ft (182.9 m) northeast of the spray block and adjacent to the orchard office, and 3) a Forest Technology System F11 on a 6 ft (1.8 m) tower located 300 ft (91.4 m) east of the spray block in an open field (Figures 1-2). All meteorological stations collected wind speed, direction, relative humidity and temperature. The Handars also recorded data each second and averaged wind gusts every minute. The Forest Technology System recorded data each minute. The wind direction for the Handar equipment was recorded in degrees and the Forest Technology equipment was recorded as one of eight directions (N, NE, E, SE, S, SW, W, NW). Meteorological data recorded for each spray trial are in tables 1-3.

Application

The aircraft sprayed a mixture of Bullseye Dye (blue) and water and the ground sprayer applied a mixture of Rhodamine Dye (red) and water. The aircraft application was 1.19 gal/acre (4.5 l). The ground sprayer application was 2.88 gal/acre (10.9 l) for days 1 and 2 and 5.76 gal/acre (21.8 l) for day 3.

Aircraft application was with a Cessna Ag Truck Model 185 flying at 110 mi/h (177 km). Table 4 provides aircraft and application parameters. Figure 3 is a schematic sketch of the aircraft nozzle locations. Each day the aircraft flew from the East with 50 ft between swaths.

Ground application was with a FMC 757 Speed Sprayer traveling at 2.5 mi/h (4.0 km). Table 5 provides ground sprayer and application parameters. Figure 4 is a schematic drawing of the ground sprayer.

Sampling

Within Orchard Sampling

Within the orchard were six sets of two trees each selected for sampling. In each of these sets were ground samplers, quadrant samplers in the crown at 25 and 40 ft above ground (7.6 and 12.2 m), and tree line samplers placed at or above the crown on a line (Figure 5). The quadrant and tree lines consisted of 12 oz beverage cans (355 ml) with 2.75 in diameter (7 cm) Kromekote samplers placed on the top and bottom of each can. Within the tree crown, cans were hung at quadrant positions, ie. N,E,S,W, at two heights above the ground. The 12 tree line Kromekote card samplers were spaced at 5 foot intervals. The 41 ground samplers, 4 x 5 in (10.2 x 12.7 cm), were placed flat on the ground 5 ft apart in two lines on either side of tree sets and attached to cardboard backing with rubber bands. Sampler position was maintained throughout the three spray days.

Drift Sampling

During each spray application, lines to measure drift were established beginning 50 ft within the orchard (15.3 m) and extending out from the spray block in 50 ft increments. There were 4 lines in place during spray days 1 and 2, and 5 on day 3 (Figure 2). Drift line samplers were Kromekote cards the same size as the ground samplers.

Trace Element Sampling

Rhodamine WT dye was added to the water applied by the ground sprayer at the rate of 0.7 gal Rhodamine WT in 100 gal of water. The dye was to be used to measure the amount of material deposited on foliage and off target samplers. Subsequent testing determined that its decay rate was too rapid to use as a tracer (Scott Cameron unpublished).

Calibration and Characterization

Aircraft

The aircraft was calibrated each day. The plane was flown into the wind at an altitude of 15 ft. The system was set to spray 1.2 gal/acre over a line of Kromekote cards placed perpendicular to the flight line. The Swath Kit electronic image analyzer was used to determine drop density and size for each card. Eight drops/cm^2 was set as the limiting drop density for effective swath width.

Ground Sprayer

The ground sprayer was calibrated to deliver 2.9 gal/acre. This was the minimal amount of material the sprayer could properly apply. The nozzles were placed on the upper portion of the sprayer to maximize upward movement of the spray. The rate on day 3 was increased to 5.8 gal/acre by doubling the number of nozzles.

Stain Deposition Measurement

Stains on kromekote cards were measured by placing each card under a dissecting microscope fitted with a graduated measuring reticule. At least 50 stains per card were counted. The area observed on each card did not exceed 16 cm^2.

Spray stain numbers and sizes were analyzed using the Automatic Spot Counting and Sizing program (ASCAS, Continuum Dynamics) to convert drop counts into spray volumes. The spray volume and numbers of drops/cm^2 were adjusted for the ground sprayer application rate to equal the aircraft application rate. When equivalent deposition is used in this report it is so noted.

Canopy Penetration Measurement

Canopy penetration is the movement of spray droplets to the ground through a forest canopy. In this study, canopy penetration was determined for each set of trees by measuring the deposition on three cans above the trees, four cans within the upper quadrant, four cans in the lower quadrant, and six flat Kromekote samplers (three each side) directly under each tree (Figure 5). For the aircraft the upper can line above the tree represented 100 percent deposition.

Results

Characterization

Volume median diameter (VMD) for the aircraft was 195.8, 135.7, and 127.2 microns for days 1, 2, and 3 respectively. The effective swath width for day 1 for a single pass was 90 ft. On day 2 the effective swath was calculated at 110 ft and on day 3 it was 100 ft. A swath width was not determined for the

ground sprayer. Based on ASCAS analysis of spray deposition on the can line the VMD for day 3 was 151 while the ground line was 202 microns.

Meteorological Conditions At Spray Time

Day 1

Spray conditions were the most extreme during the three day trial with maximum wind gusts of 5.5 mi/h and 7.2 mi/h recorded during the air and ground applications respectively (Table 1). The wind was out of the west-southwest with temperatures in the lower eighties and relative humidities in the upper sixties to mid eighties. Within the test site, wind speed was always greater above the tree crown than at either mid-crown or ground level positions (Tables 1-3).

Day 2

Spray conditions were milder (Table 2) with wind from the west at generally less than two mi/h. Relative humidity was lower ranging from 58.6 to 93 percent.

Day 3

The wind at 55 ft, ranged up to 2.6 mi/h from the north-northwest. Relative humidity in the orchard ranged from 68.7 to 90 percent and the temperature went to 82.3 F^{o} during the ground sprayer application (Table 3).

Tree Line Deposition

Day 1

Deposition on the top tree line samplers was variable among the six tree lines. The average drops/cm^2 on the top card surface (Table 6) ranged from 3.35 to 11.17 with the aircraft. The aircraft deposition ranged from 14.18 to 156.57 fl oz/acre on the top card surface compared to deposition of from 1.34 to 7.27 fl oz/acre from the ground sprayer. Tree line deposition for either the top or bottom Kromekote sampler was generally less with the ground sprayer (Table 7 and Figures 6-10).

Day 2

Ground sprayer deposition was greatest on the number four tree line top card position where 1.87 drops/cm^2 were recorded. This amounted to an equivalent of 9.55 fl oz/acre. Generally ground sprayer deposition was higher on the bottom surface than on the top surface. Aircraft deposition was usually greater than ground deposition on the top card sampler (Figures 11-17).

Day 3

Aircraft deposition was highest of the three day trial with deposition (top card) ranging from 11.13 to 28.69 drops/cm^2 per tree line. This average deposition was far better than found the previous two days. The bottom samplers received little aircraft deposition as was the case the previous two days. The average deposition for the ground sprayer on the tree line samplers was less than the aircraft. The most deposition by the ground sprayer was less than half the aircraft deposition on similar cards (Figures 18-23).

Ground Line Deposition

Day 1

The ground sprayer application resulted in less deposition on ground cards than did the aircraft application (Figures 24-26 and Tables 8-9). Deposition averaged 46.5 fl oz/acre from the aircraft and 35.01 fl oz/acre from the ground sprayer. There was no ground line six for day 1.

Day 2

Deposition from the aircraft for all ground lines averaged 52.3 fl oz/acre as compared to 15.0 fl oz/acre from the ground sprayer. Aircraft spray droplet concentration in drops/cm^2 ranged from 5.07 to 8.84 while the ground sprayer ranged from 2.23 to 3.03 (Tables 7-8). Figures 27-29 depict the actual deposition across the ground lines as applied.

Day 3

Aircraft spray droplet concentration ranged from 4.4 to 9.7 drops/cm^2 while the ground sprayer's deposition was 1.6 to 3.5 drops/cm^2 (Tables 8-9). Average aircraft deposition on all ground cards was 21.0 fl oz/acre and with the ground sprayer 15.2 fl oz/acre. Figures 30-32 depict the actual spray deposits in drops/cm^2 as applied.

Canopy Penetration

Day 1

Analysis of canopy penetration resulting from aerial application determined that 20.3 percent of the maximum deposition found on the upper tree line cans reached the ground (Figure 33). On the upper quadrant cans (top card), 22.5 percent deposition (drops/cm^2) was recorded while another 15.3 percent was deposited on the quadrant cans in the lower quadrant. On the upper can line there was an average of 19.46 drops/cm^2 (top card). On the bottom card (upper can line) the deposition was only 0.94 drops/cm^2 as compared to 3.37 from the ground sprayer. Deposition averaged 73.01 fl oz/acre for the upper tree line (top card) directly above sample trees and 57.29 on the ground line under the trees (Figure 34). At 40 ft in the upper quadrant, the most deposition detected was 36.43 fl oz/acre with the aircraft (top card) as compared to 9.77 with the ground sprayer (bottom card).

The most deposition for the ground sprayer was found on the lower quadrant cans (bottom card) where 7.92 drops/cm^2 were detected. On the ground line under the trees there were 5.73 drops/cm^2 compared to 3.96 from the aircraft. This was the only spray which resulted in more deposition on the ground line from the ground sprayer than from the aircraft.

Day 2

The six ground samplers for each of the 12 trees received an average of 7.2 and 2.6 drops/cm^2 for the aircraft and ground sprayers respectively (Figure 35). For the aircraft this was 52.1 percent of the maximum attained on the tree line above the canopy. Canopy deposition for the upper and lower canopy (top card) for the aircraft was 4.1 and 3.5 drops/cm^2 respectively which represented 29.4 and 25.2 percent of the upper tree line deposition.

Ground sprayer deposition was greatest on the lower quadrant cans where 9.94 drops/cm^2 were found as compared to 0.07 for the aircraft. Deposition in fl oz/acre amounted to 77.03 on the lower quadrant samplers (bottom card) and only 12.21 on the ground line (Figure 36). The average deposition on the upper quadrant cans (bottom card) was 5.08 fl oz/acre as compared to 5.21 on the upper can line (bottom card).

Day 3

The highest concentration of droplets detected on the tree line above the tree crown during the three day trial was on day 3 (top card) where 21.8 drops/cm^2 (Figure 37) or 51.81 fl oz/acre (Figure 38) were found. Deposition as a percent of the tree line in drops/cm^2 for the upper and lower quadrant (top card) and ground lines for aircraft application was 30.6, 23.4, and 36.3 percent respectively.

Maximum deposition for the ground sprayer was found on the lower quadrant cans (bottom card) at 9.64 drops/cm^2 or 18.29 fl oz/acre, however, there was no aircraft deposition on these cards. At 40 ft maximum deposition was 6.31 fl oz/acre on the top sampler.

Spray Drift

Day 1

Deposition within the orchard and at the orchard edge for both the air and ground sprayer was between 44.9 and 46.5 fl oz/acre on day 1, drift line one (Tables 10-11) which was most nearly downwind of the spray blocks (Figure 2). Deposition dropped off rapidly within 150 ft of the orchard with droplets detected to 300 ft (Figures 39-40). Spray deposit ratios (Table 12) indicate deposition after 150 ft of the orchard was less 0.03 percent of that found inside the orchard following the ground sprayer application. Drift deposition on drift line one for the aircraft was slightly higher with little detected beyond 200 ft of the treated blocks. Deposition from the aircraft dropped below 20 percent of orchard values beyond 150 ft downwind of the spray block.

Day 2

Drift cards on line one were wet starting at 200 ft from the orchard and the cards were not counted, however, they did receive deposition from the aircraft. Trace amounts of spray drift were detected on line two up to 400 ft for both applicators (Figures 41-42) with little difference noted between applicator types (Tables 10-12).

Day 3

On day 3 the wind was slightly higher and more deposition was detected downwind from the aircraft application (Figures 43-45). Deposition in small quantities was detected downwind on drift line one and zero to 1000 and 650 ft respectively with a wind 1.9 mi/h and a gust of 2.6 mi/h. On drift card line two, aircraft deposition was detected to 400 ft while ground sprayer deposition was detected to 200 ft. Ground sprayer drift deposition for drift line one was detected to only 250 ft beyond the orchard edge. Ground sprayer deposition for drift lines zero, one, and two fell below one fl oz/acre beyond 100-150 ft of the orchard edge and in comparison the aircraft deposition exceeded one fl oz/acre up to 350 ft on line one, and 200 ft on line zero and 150 ft for line two.

Upper Quadrant Deposition

Day 1

Aircraft and ground sprayer deposition was variable both between tree lines and quadrants (Figures 46-51). The aircraft deposition ranged up to 107.87 fl oz/acre on tree line four (top card). Spray deposition from the aircraft (bottom card) was much less ranging from 0.0 to 0.64 fl oz/acre (Table 13). Maximum ground sprayer deposition (bottom card) was found on tree set six to be 1.53 drops/cm^2 (Table 14).

Day 2

Spray deposition for both air and ground sprayers was variable between quadrants (Figures 52-57). There was more spray deposition from the aircraft on the tops of the spray cans than on the bottoms (Table 13). Spray deposition ranged up to 19.38 fl oz/acre on tree line four upper tops of quadrant can kromekote paper. In most cases the majority of spray deposition from the ground sprayer was found on the bottoms of the cans.

Day 3

Spray deposition was highly variable between quadrants (Figures 58-63). Average deposition from the ground sprayer was higher on the top of the can sampler than on the bottom at 6.30 and 5.4 fl oz/acre respectively. This compares with aircraft deposition on the top of the cans of 17.01 fl oz/acre.

Lower Quadrant Deposition

Day 1

Spray deposition on the top card in the lower quadrant ranged from 6.61 to 38.5 fl oz/acre for the aircraft (Table 15). This compares to ground deposition of up to 39.22 fl oz/acre (Table 16). On the bottom of the same cans the ground sprayer deposition on the same cards ranged up to 124.77 fl oz/acre.

Day 2

Aircraft deposition on the top of the spray cans was less than day 1 and very little deposition was found on the bottom of the cans. In comparison most of the ground sprayer deposition was detected on the bottom of the cans ranging up to 123.48 fl oz/acre.

Day 3

Deposition was less this day from the ground sprayer than on previous days and the average deposition was nearly evenly distributed between top and bottom sample cards ie. 17.1 and 18.3 fl oz/acre. There was no aircraft deposition on the bottom cards while deposition on the top cards ranged up to 16.06 fl oz/acre or 6.98 drops/cm^2.

Discussion

Insect control is crucial to seed orchard managers and the desire to adopt new spray technology has spawned several nationwide training sessions. Forest Pest Management made a commitment to the southern forest genetics industry to improve seed yields through reduced losses from insect pests. The Withlacoochee Seed Orchard spray trials evaluated the feasibility of aerial application to seed orchards, however, ground spray application was not fully tested.

In this study aerial application resulted in deposition (drops/cm^2) on the ground samplers of 20.3 to 52.1 percent of the deposition on the tree line 52 ft above (top card). On ground line spray cards directly under the trees (Figures 33-38), for two out of three days there was more spray deposition on the ground following aircraft application. However, if all 41 ground cards per tree line were evaluated, there was always more deposition on the ground cards following the aircraft application.

The ground sprayer was more efficient at applying spray droplets to cans hung 25 ft above the ground. In comparison, the aircraft was far more efficient at applying spray droplets to cans hung at 40 ft above the ground. In most years, the cone crop starts at or above mid crown, thus it is of vital importance to deliver the pesticide to the upper canopy at heights equal to or exceeding 40 ft.

Off target spray drift is increasingly becoming an important issue. This study was in general agreement with past aircraft spray drift studies. In the Claxton Trials, on day 1 spray drift from the aircraft was 20 percent of the orchard deposition 150 ft outside the spray block and 8 percent at 200 ft. On day 2 aircraft spray deposition was only 18 percent of orchard deposition 150 ft. On day 3 deposition fell to 19 percent of orchard deposits at 250 ft but small amounts of deposition were recorded to 1,000 ft. Drift line zero also had deposition of over 50 percent of the orchard deposition at 200 ft..

In comparison, drift from the ground sprayer was in nearly every case less than the aircraft when equivalent spray volumes were used. Drift on 1 one was 20 percent the orchard deposition 150 ft downwind on drift line one. On day 2 deposition was only 18 percent at 150 ft downwind of the spray block on drift line one. For day 3 on drift line one, deposition was 107 percent that found in the orchard, 150 ft from the orchard edge. No spray drift was detected beyond 250 ft for the ground sprayer as compared to drift up to 1,000 ft for the aircraft.

In this evaluation, drop size and volumes did not represent a normal spray application for the ground sprayer or the aircraft. Under normal spray conditions an orchard manager would applied 100 gal of spray mix per acre at approximately 350 VMD with a ground sprayer. Based on a ground sprayer

application volume of 100 gal/acre on day 1, 2, and 3 for drift line one there would have been 329.2, 31.7, and 14.2 fl oz/acre at 150 ft from the orchard. This would compare to aircraft deposition of 50, 55, and 201 fl oz/acre at 150 ft on drift line one for days 1, 2, and 3 if the aircraft application was at 10 gal/acre. Under normal conditions, when applying azinphos-methyl the VMD would be 350 microns and would result in less drift. Aircraft application of Foray 48B, however is at 1 gal/acre at droplet sizes less than 200 microns. At this spray application volume the drift at 150 ft is projected to be 5.0, 5.5 and 20.1 fl oz/acre on days 1, 2, and 3 for drift line one.

Problems arising from spray drift from aircraft or ground sprayers is mitigated in most orchards by buffer zones which surround most southern pine orchards. In most cases the majority of spray drift deposits would fall within these buffer zones.

Recommendations

Because these data suggest more spray drift from aircraft in seed orchards compared to ground sprayer, additional tests should measure spray drift from both ground sprayers and aircraft. Because new evidence indicates Rhodamine WT breaks down too fast under field conditions future tests should include a different tracer such as manganese sulfate or other dye. More sophisticated equipment should be used to measure off-site drift. This might include electrically powered air vacuums for collecting small diameter spray droplets. Additional meteorological equipment is also needed to measure weather at many heights both inside and outside the orchard. Any additional tests should be conducted in the South during the summer when conditions are similar to the conditions of this study. Additionally, several types of ground sprayers should be evaluated for spray drift.

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Disclaimer

The use of trade, firm, or corporation names is for the information and convenience of the reader. Such use does not constitute an official evaluation, conclusion, recommendation, endorsement, or approval of any product or service to the exclusion of others which may be suitable.

Caution: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife-if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

Table 1--Meteorological data, August 20, 1991, Claxton Spray Trials

Day 1

	Handar		Forest tech
	22 ft	55 ft	system - 6 ft
Aircraft Start - 10:15 am			
Stop - 10:24 am			
Windspeed	3.1 mi/h	3.8 mi/h	5.3 mi/h
Wind direction	238°	244°	270°
Wind gust	4.6 mi/h	5.5 mi/h	NA
Relative humidity	85.3 %	76.8 %	89.%
Temperature	83.8°F	83.2°F	82.0°F
Ground sprayer Start - 10:45 am			
Stop - 11:50 am			
Windspeed	3.7 mi/h	5.4 mi/h	5.2 mi/h
Wind direction	253°	271°	225°
Wind gust	5.5 mi/h	7.2 mi/h	NA
Relative humidity	68.9 %	69.5 %	83.0 %
Temperature	86.0°F	85.2°F	84.4°F

Table 2--Meteorological data, August 21, 1991, Claxton Spray Trials

Day 2

	Handar		Forest tech
	22 ft	55 ft	system - 6 ft
Aircraft Start - 9:51 am			
Stop - 10:01 am			
Windspeed	0.0 mi/h	0.4 mi/h	3.3 mi/h
Wind direction	277°	281°	315°
Wind gust	0.0 mi/h	0.6 mi/h	NA
Relative humidity	69.0 %	65.3 %	93.0 %
Temperature	78.0°F	80.2°F	71.4°F
Ground sprayer Start - 10:15 am			
Stop - 11:15 am			
Windspeed	0.5 mi/h	1.4 mi/h	1.6 mi/h
Wind direction	279°	246°	270°
Wind gust	1.0 mi/h	2.5 mi/h	NA
Relative humidity	59.5 %	58.6 %	78.0 %
Temperature	80.0°F	83.9°F	78.3°F

Table 3--Meteorological data, August 22, 1991, Claxton Spray Trials

Day 3

	Handar		Forest tech system - 6 ft
	22 ft	55 ft	
Aircraft Start - 9:40 am Stop - 9:51 am			
Windspeed	5.5 mi/h	1.9 mi/h	0.0 mi/h
Wind direction	293°	273°	270°
Wind gust	1.7 mi/h	2.6 mi/h	NA
Relative humidity	75.9 %	70.9 %	90.0 %
Temperature	81.0°F	81.0°F	72.4°F
Ground sprayer Start - 10:07 am Stop - 11:07 am			
Windspeed	0.9 mi/h	1.8 mi/h	1.8 mi/h
Wind direction	238°	242°	315°
Wind gust	1.8 mi/h	2.6 mi/h	NA
Relative humidity	68.7 %	68.2 %	81.0 %
Temperature	82.3°F	82.3°F	80.1°F

Table 4--Aircraft and application parameters, Claxton Spray Trials, August 1991

Parameter	Cessna Ag-Truck
Aircraft weight (lb/kg)	2236 (1014)
Wing length (ft/m)	41.67 (12.74)
Speed (mi/h)	110
Spray altitude above canopy (ft/m)	10 (3.1)
Swath width (ft/m) Day 1	90 (27.4)
Swath width (ft/m) Day 2	110 (33.5)
Swath width (ft/m) Day 3	100 (30.5)
Nozzle type and size (FF)	8003
Nozzle orientation	Straight back
Number of nozzles	38
Boom pressure - (lb/in^2 g)	40
Application rate gal/acre (1/ha)	1.2 (11.2)
Spray mixture	2% Bullseye (50 gal water to 1 gal Bullseye)

Table 5--FMC 757 Ground-sprayer application parameters, Claxton Ground Spray Trials, August 1991

Parameters	Specifications
Engine	Diesel
Cylinders	4
Horsepower (max at 2800 r/min)	140
Tank Capacity (gal)	500
Maximum number of nozzles	54
Nozzel size and number Spray days 1 and 2 - 1 nozzle each side Spray day 3 - 2 nozzles each side	 2 4
Propeller diameter (in/cm)	41 (104.1)
Number of fan blades	7
Unit length (ft/m)	17'4" (5.3)
Height (in/m)	69" (1.75)
Unit weight full tank (est) (lb/kg)	9900 (4490)
System pressure during test (lb/in^2g)	50
Application rate for days 1 and 2 gal/acre (l/ha)	2.88 (26.9)
Application rate for day 3 gal/acre (l/ha)	5.76 (53.8)
Ground speed (mi/h)	2.5
Spray mixture	0.7% Rhodamine WT (100 gal [378.5 L] water and 0.7 gal [2.7 L] Rhodamine).

Table 6--Average aircraft spray deposition on tree line samples - Claxton Spray Trials, 1991

Trial day	Tree line	Number of samples	Drops/cm^2		Fluid ounces/acre	
			Top	Bottom	Top	Bottom
Aug. 20, 1991	1	11	3.35	1.68	14.18	3.29
	2	12	10.26	0.75	68.14	0.85
	3	12	5.36	0.63	24.44	0.55
	4	12	11.17	1.15	156.57	1.53
	5	12	8.58	0.15	64.94	0.42
	6	12	6.66	2.35	56.81	0.41
Aug. 21, 1991	1	12	11.21	0.50	65.43	0.47
	2	12	13.76	0.02	32.52	0.02
	3	12	5.12	0.00	21.79	0.00
	4	12	11.97	0.23	135.12	0.17
	5	12	6.86	0.01	26.29	0.01
	6	12	6.04	0.00	22.34	0.00
Aug. 22, 1991	1	12	11.13	0.07	78.52	0.06
	2	12	11.13	0.07	54.21	0.10
	3	12	16.16	0.08	43.24	0.07
	4	12	11.34	0.10	47.88	0.05
	5	12	21.56	0.01	50.81	0.00
	6	12	28.69	0.06	64.83	0.05

Aircraft application rate was 1.2 gal/acre.

Table 7--Average ground sprayer deposition on tree line samples - Claxton Spray Project, 1991

Trial day	Tree line	Number of samples	Drops/cm^2		Fluid ounces/acre	
			Top	Bottom	Top	Bottom
Aug. 20, 1991	1	11	0.48	0.53	1.34	0.85
	2	12	0.78	3.43	2.26	20.31
	3	12	0.99	2.47	2.80	10.33
	4	12	1.60	3.04	7.27	8.48
	5	12	1.45	1.75	5.06	9.71
	6	12	1.99	1.62	6.65	11.59
Aug. 21, 1991	1	12	1.01	0.63	0.81	1.36
	2	12	1.01	1.36	2.00	5.72
	3	12	0.47	0.42	1.48	3.69
	4	12	1.86	3.95	9.55	28.45
	5	12	0.39	0.32	0.95	0.60
	6	12	1.77	2.33	4.47	9.84
Aug. 22, 1991	1	12	0.94	0.64	3.03	7.90
	2	12	0.94	0.64	2.72	2.48
	3	12	2.00	1.75	5.44	10.74
	4	12	3.92	5.30	10.26	14.60
	5	12	1.10	0.37	2.73	1.22
	6	12	3.89	1.64	9.47	10.95

Ground sprayer data equivalent to 1.2 gal/acre.

Table 8--Average aircraft spray deposition on ground line samples - Claxton Spray Trials, 1991

Trial day	Tree line	Number of samples	Drops/cm^2	Fluid ounces/acre
Aug. 20, 1991	1	41	2.54	45.09
	2	41	4.09	59.99
	3	41	4.35	48.13
	4	41	2.68	21.66
	5	41	2.66	57.92
	6	Cards were not put out		
Aug. 21, 1991	1	41	8.84	50.83
	2	40	7.30	48.03
	3	40	7.43	77.06
	4	41	6.59	60.80
	5	41	5.15	39.68
	6	41	5.07	37.66
Aug. 22, 1991	1	41	4.36	18.66
	2	41	6.62	61.99
	3	41	9.70	84.96
	4	41	7.68	62.68
	5	40	8.08	67.98
	6	41	7.63	46.70

Aircraft application rate was 1.2 gal/acre.

Table 9--Average ground sprayer deposition on ground line samples - Claxton Spray Trials, 1991

Trial day	Tree line	Number of samples	Drops/cm^2	Fluid ounces/acre
Aug. 20, 1991	1	41	5.30	36.55
	2	41	6.56	43.63
	3	41	7.18	32.08
	4	41	4.77	22.75
	5	41	6.91	40.07
	6	Cards were not put out		
Aug. 21, 1991	1	41	2.86	16.35
	2	40	2.36	14.66
	3	40	2.24	15.04
	4	41	3.03	17.34
	5	41	2.23	14.35
	6	41	2.50	12.38
Aug. 22, 1991	1	41	1.55	17.44
	2	41	2.32	19.77
	3	41	2.95	25.98
	4	41	3.55	23.48
	5	40	3.04	21.76
	6	41	2.26	17.52

Ground spray rate equivalent to 1.2 gal/acre.

Table 10--Ground spray deposition on drift line samplers - Claxton Spray Trials, 1991

	Drift line 1		Drift line 2		Drift line 3		Drift line 4		Drift line 0	
	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre
Day 1										
-50	7.72	44.90	7.30	91.43	3.93	24.03	7.17	33.10	NA	NA
0	5.69	29.75	12.00	88.68	7.02	28.80	1.62	6.72	NA	NA
+50	2.41	12.18	2.30	37.67	1.06	4.80	0.00	0.00	NA	NA
+100	4.30	21.14	0.05	0.62	0.16	0.02	0.00	0.00	NA	NA
+150	1.48	3.95	0.03	0.10	0.00	0.00	0.00	0.00	NA	NA
+200	0.31	0.73	0.03	0.10	0.00	0.00	0.00	0.00	NA	NA
+250	0.34	1.10	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA
+300	0.08	0.01	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+350	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+400	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+450	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
+500	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Day 2										
-50	1.83	6.19	2.95	21.09	wc	wc	1.99	9.83	NA	NA
0	5.90	20.18	2.34	11.04	0.21	37.20	wc	wc	NA	NA
+50	8.00	56.10	3.61	15.43	4.22	6.55	wc	wc	NA	NA
+100	1.24	4.20	1.16	5.23	1.99	1.31	0.00	0.00	NA	NA
+150	0.26	0.38	0.47	2.15	0.65	0.17	0.00	0.00	NA	NA
+200	wc	wc	0.21	0.33	0.10	0.008	0.00	0.00	NA	NA
+250	wc	wc	0.18	0.81	0.05	0.00	0.00	0.00	NA	NA
+300	wc	wc	0.03	0.04	NA	NA	0.00	0.00	NA	NA
+350	NA	NA	0.03	0.004	NA	NA	0.00	0.00	NA	NA
+400	NA	NA	0.05	0.008	NA	NA	0.00	0.00	NA	NA
+450	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
+500	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Day 3										
-50	3.16	31.04	5.38	41.20	2.69	33.66	4.07	8.92	2.84	15.40
0	4.00	17.33	3.16	15.84	6.62	32.28	7.86	28.86	0.80	1.71
+50	5.17	26.55	0.83	4.95	2.40	11.23	0.05	0.08	0.01	0.025
+100	0.38	1.97	0.21	0.64	0.98	4.26	0.03	0.04	0.01	0.025
+150	0.09	0.17	0.06	0.17	0.01	0.02	0.00	0.00	0.00	0.00
+200	0.08	0.17	0.06	0.03	0.04	0.004	0.00	0.00	0.00	0.00
+250	0.06	0.09	0.00	0.00	0.04	0.25	0.00	0.00	0.00	0.00
+300	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00
+350	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00
+400	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00	0.00
+450	0.00	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00
+500	0.00	0.00	NA	NA	NA	NA	0.00	0.00	0.00	0.00
+550	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+600	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+650	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+700	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+750	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+800	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+850	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+900	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+950	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+1000	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00

Ground sprayer data equivalent to 1.2 gal/acre.
NA = not applicable; wc = wet card

Table 11--Aircraft spray deposition on drift line samplers - Claxton Spray Trials, 1991

	Drift line 1		Drift line 2		Drift line 3		Drift line 4		Drift line 0	
	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre	Drops/cm^2	fluid ounces/acre
Day 1										
-50	3.50	17.22	0.00	0.00	3.19	87.00	2.56	7.08	NA	NA
0	2.44	46.51	0.00	0.00	0.00	0.00	1.38	10.41	NA	NA
+50	3.31	31.21	0.00	0.00	0.00	0.00	0.50	2.04	NA	NA
+100	2.19	17.27	0.00	0.00	0.00	0.00	0.19	1.85	NA	NA
+150	1.63	6.28	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA
+200	.69	2.63	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA
+250	.69	5.59	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA
+300	.13	0.15	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+350	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+400	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+450	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
+500	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Day 2										
-50	6.20	76.56	7.63	80.52	wc	wc	4.29	7.71	NA	NA
0	2.19	0.98	5.18	31.06	2.88	26.87	wc	wc	NA	NA
+50	9.00	36.98	0.50	1.68	1.81	1.60	wc	wc	NA	NA
+100	15.50	48.91	0.25	0.16	0.56	0.67	1.88	5.60	NA	NA
+150	6.56	6.89	1.63	0.95	0.50	0.46	0.81	1.48	NA	NA
+200	wc	wc	1.31	0.36	0.00	0.00	0.44	9.33	NA	NA
+250	wc	wc	0.63	0.18	0.00	0.00	0.13	0.15	NA	NA
+300	wc	wc	0.38	0.16	NA	NA	0.19	0.22	NA	NA
+350	NA	NA	0.19	0.01	NA	NA	0.00	0.00	NA	NA
+400	NA	NA	0.44	0.03	NA	NA	0.00	0.00	NA	NA
+450	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
+500	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Day 3										
-50	6.13	43.72	7.57	60.22	6.50	77.23	5.67	19.68	3.44	29.16
0	2.19	1.41	4.91	11.20	8.86	46.10	9.17	66.42	2.00	3.30
+50	7.14	31.09	3.25	14.55	6.33	56.47	4.45	77.53	5.33	33.01
+100	5.69	33.81	3.53	2.64	2.19	1.70	7.57	21.26	5.91	15.48
+150	5.67	25.08	3.60	1.42	0.94	0.55	0.81	8.80	14.75	53.92
+200	4.31	11.57	2.50	0.71	0.38	0.02	0.19	0.59	3.13	9.86
+250	3.60	4.19	1.81	0.46	0.06	0.00	0.13	0.44	1.44	0.72
+300	2.44	4.19	1.94	0.75	NA	NA	0.00	0.00	0.38	0.16
+350	2.44	1.07	1.13	0.21	NA	NA	0.00	0.00	0.69	0.54
+400	1.56	0.78	0.94	0.73	NA	NA	0.00	0.00	0.44	0.38
+450	1.13	0.30	NA	NA	NA	NA	0.00	0.00	0.13	0.15
+500	0.94	0.07	NA	NA	NA	NA	0.00	0.00	0.25	0.16
+550	0.25	0.20	NA	NA	NA	NA	NA	NA	0.00	0.00
+600	0.69	0.01	NA	NA	NA	NA	NA	NA	0.38	0.09
+650	0.56	0.11	NA	NA	NA	NA	NA	NA	0.38	0.02
+700	0.00	0.17	NA	NA	NA	NA	NA	NA	0.00	0.00
+750	0.25	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+800	0.00	0.16	NA	NA	NA	NA	NA	NA	0.00	0.00
+850	0.19	0.01	NA	NA	NA	NA	NA	NA	0.00	0.00
+900	0.19	0.01	NA	NA	NA	NA	NA	NA	0.00	0.00
+950	0.19	0.01	NA	NA	NA	NA	NA	NA	0.00	0.00
+1000	0.31	0.02	NA	NA	NA	NA	NA	NA	0.00	0.00

Bullseye application rate 1.2 gal/acre.
NA = not applicable; wc = wet card

Table 12--Drift deposit ratios from aerial and ground tank mixes comparing deposition within the orchard to drift sites outside the orchard - Claxton Spray Trials, 1991

	Drift line 1		Drift line 2		Drift line 3		Drift line 4		Drift line 0	
	R[1]	B[2]	R[1]	B[2]	R[1]	B[2]	R[1]	B[2]	R[1]	B[2]
	Spray deposit ratios									
Day 1										
+50	0.33	0.98	0.42	0.00	0.18	0.00	0.00	0.23	NA	NA
+100	0.58	0.54	0.01	0.00	0.001	0.00	0.00	0.21	NA	NA
+150	0.11	0.20	0.001	0.00	0.00	0.00	0.00	0.00	NA	NA
+200	0.02	0.08	0.001	0.00	0.00	0.00	0.00	0.00	NA	NA
+250	0.03	0.18	0.00	0.00	0.00	0.00	0.00	0.00	NA	NA
+300	0.0002	0.001	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+350	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+400	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
+450	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
+500	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Day 2										
+50	4.25	0.95	0.96	0.03	0.18	0.25	wc	wc	NA	NA
+100	0.32	1.26	0.33	0.003	0.04	0.06	0.00	0.73	NA	NA
+150	0.03	0.18	0.13	0.02	0.01	0.02	0.00	0.19	NA	NA
+200	wc	wc	0.02	0.01	0.0002	0.02	0.00	1.21	NA	NA
+250	wc	wc	0.05	0 003	0.00	0.00	0.00	0.02	NA	NA
+300	wc	wc	0.003	0.003	NA	NA	0.00	0.03	NA	NA
+350	NA	NA	0.0002	0.0002	NA	NA	0.00	0.00	NA	NA
+400	NA	NA	0.0004	0.0005	NA	NA	0.00	0.00	NA	NA
+450	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
+500	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Day 3										
+50	1.10	1.38	0.17	0.41	0.34	0.92	0.004	1.80	0.003	2.03
+100	0.08	1.50	0.02	0.07	0.13	0.03	0.002	0.49	0.003	0,95
+150	0.01	1.11	0.01	0.04	0.001	0.01	0.00	0.20	0.00	3.32
+200	0.01	0.51	0.001	0.02	0.0001	0.0003	0.00	0.01	0.00	0.61
+250	0.004	0.19	0.00	0.01	0.001	0.00	0.00	0.01	0.00	0.04
+300	0.00	0.05	0.00	0.02	NA	NA	0.00	0.00	0.00	0.01
+350	0.00	0.03	0.00	0.01	NA	NA	0.00	0.00	0.00	0.03
+400	0.00	0.01	0.00	0.02	NA	NA	0.00	0.00	0.00	0.23
+450	0.00	0.003	NA	NA	NA	NA	0.00	0.00	0.00	0.01
+500	0.00	0.01	NA	NA	NA	NA	0.00	0.00	0.00	0.01
+550	0.00	0.0004	NA	NA	NA	NA	NA	NA	0.00	0.00
+600	0.00	0.005	NA	NA	NA	NA	NA	NA	0.00	0.01
+650	0.00	0.01	NA	NA	NA	NA	NA	NA	0.00	0.001
+700	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+750	0.00	0.01	NA	NA	NA	NA	NA	NA	0.00	0.00
+800	0.00	0.00	NA	NA	NA	NA	NA	NA	0.00	0.00
+850	0.00	0.0004	NA	NA	NA	NA	NA	NA	0.00	0.00
+900	0.00	0.0004	NA	NA	NA	NA	NA	NA	0.00	0.00
+950	0.00	0.0004	NA	NA	NA	NA	NA	NA	0.00	0.00
+1000	0.00	0.0009	NA	NA	NA	NA	NA	NA	0.00	0.00

[1] = Rhodamine dye from ground-sprayer. Equivalent Rate = 1.2 gal/acre.
[2] = Bullseye dye from aircraft. Rate = 1.2 gal/acre.
NA = not applicable; wc = wet card

Table 13--Average aircraft spray deposition on upper quandrant samples, Claxton Spray Project, 1991

Trial day	Tree line	Number of samples	Drops/cm^2		Fluid ounces/acre	
			Top	Bottom	Top	Bottom
Aug. 20, 1991	1	8	2.96	0.02	24.83	0.06
	2	8	3.28	0.00	25.34	0.00
	3	8	3.35	0.09	11.81	0.14
	4	8	11.12	0.29	107.87	0.33
	5	8	2.85	0.05	33.25	0.20
	6	8	2.69	0.16	15.49	0.64
Aug. 21, 1991	1	8	7.46	0.02	13.50	0.02
	2	8	5.02	0.01	14.72	0.00
	3	8	1.69	0.03	3.72	0.01
	4	8	6.39	0.00	19.38	0.00
	5	8	1.54	0.01	1.69	0.00
	6	8	2.20	0.00	2.84	0.00
Aug. 22, 1991	1	8	4.33	0.02	11.87	0.01
	2	8	6.76	0.00	26.26	0.00
	3	8	7.93	0.00	9.48	0.00
	4	8	6.01	0.02	11.28	0.01
	5	8	6.06	0.01	9.08	0.00
	6	8	8.92	0.00	34.11	0.00

Aircraft application rate was 1.2 gal/acre.

Table 14--Average ground sprayer deposition on upper quandrant sampler cards at 40 ft - Claxton Spray Project, 1991

Trial day	Tree line	Number of samples	Drops/cm^2		Fluid ounces/acre	
			Top	Bottom	Top	Bottom
Aug. 20, 1991	1	8	0.74	0.56	1.73	3.63
	2	8	1.24	0.72	6.09	19.30
	3	8	1.27	1.20	4.42	8.23
	4	8	1.51	1.57	7.56	13.40
	5	8	0.95	0.96	7.08	5.83
	6	8	1.53	2.25	6.14	8.21
Aug. 21, 1991	1	8	1.32	1.02	2.56	1.82
	2	8	1.03	0.96	2.80	8.98
	3	8	1.03	0.99	2.64	4.72
	4	8	2.04	1.91	6.00	10.31
	5	8	0.70	0.75	1.58	1.20
	6	8	2.07	1.54	4.23	3.42
Aug. 22, 1991	1	8	1.31	1.26	3.25	4.31
	2	8	1.27	0.93	5.68	3.89
	3	8	3.32	2.27	8.16	7.38
	4	8	2.38	1.16	10.31	9.72
	5	8	1.92	1.23	3.93	3.19
	6	8	2.14	1.03	6.52	3.95

Ground applicaiton rate on August 20-21 was 2.88 gal/acre and 5.76 gal/acre on August 22, 1991.

Table 15--Average aircraft spray deposition on lower quandrant samples, Claxton Spray Project, 1991

Trial day	Tree line	Number of samples		Drops/cm^2		Fluid ounces/acre	
		Top	Bottom	Top	Bottom	Top	Bottom
Aug. 20, 1991	1	8	8	1.93	0.02	27.18	0.001
	2	8	7	2.85	0.00	35.79	0.00
	3	8	8	3.40	0.04	19.23	0.07
	4	8	7	6.66	0.02	38.50	0.01
	5	8	8	1.97	0.00	19.98	0.00
	6	8	8	1.09	0.01	6.61	0.00
Aug. 21, 1991	1	8	8	5.74	0.00	11.97	0.00
	2	8	8	4.73	0.00	7.27	0.00
	3	8	8	0.88	0.00	0.68	0.31
	4	8	8	4.52	0.00	10.44	0.00
	5	8	8	1.90	0.01	1.80	0.00
	6	8	8	3.04	0.43	15.20	0.19
Aug. 22, 1991	1	8	7	3.63	0.00	16.06	0.00
	2	8	8	5.30	0.00	14.27	0.00
	3	8	8	6.98	0.00	11.68	0.00
	4	8	8	4.36	0.00	8.30	0.00
	5	7	8	5.71	0.00	8.94	0.00
	6	8	8	4.68	0.00	15.52	0.00

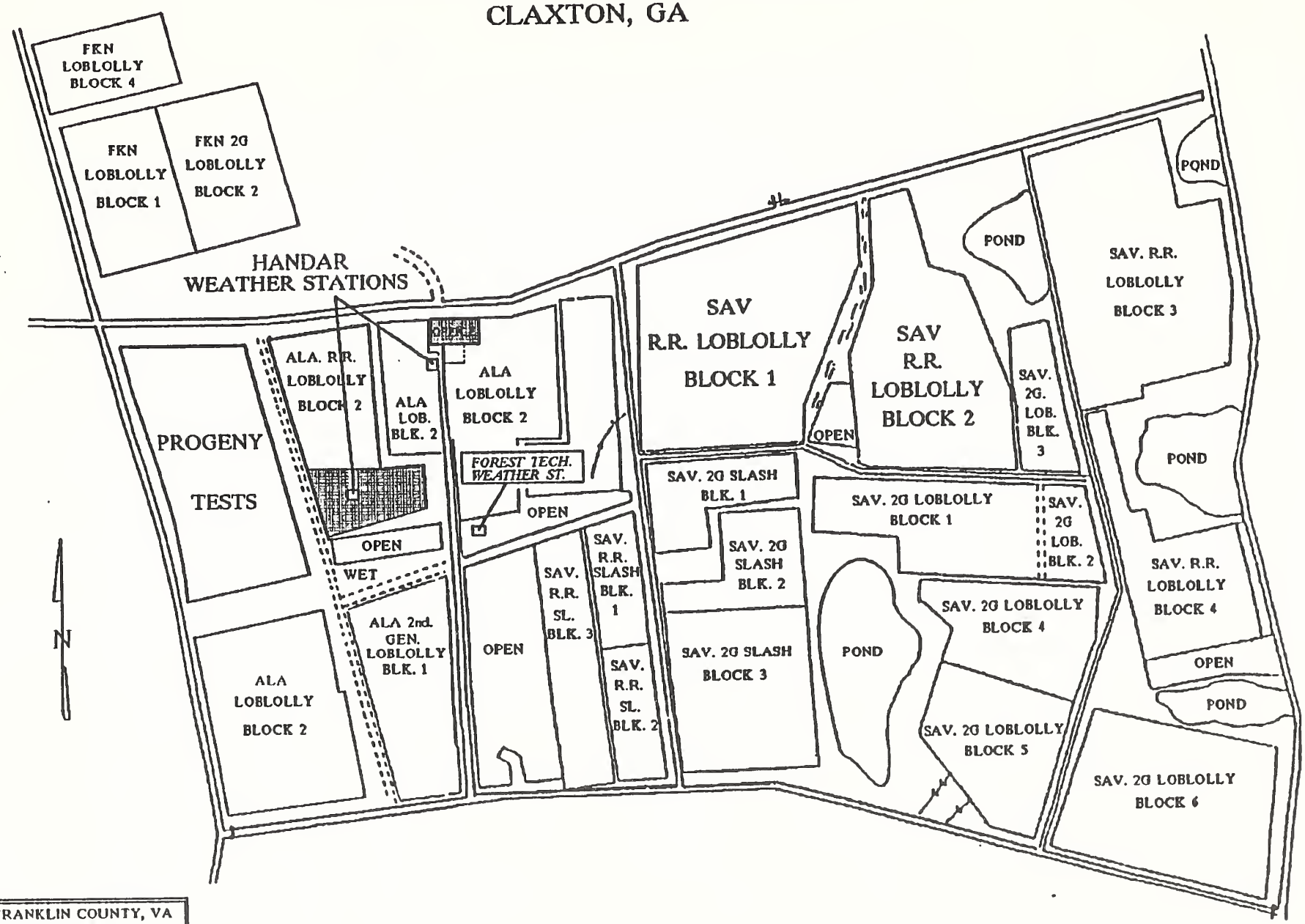
Aircraft applicaiton rate was 1.2 gal/acre.

Table 16--Average ground sprayer deposition on lower quandrant sampler cards at 25 ft - Claxton Spray Project, 1991

Trial day	Tree line	Number of samples		Drops/cm^2		Fluid ounces/acre	
		Top	Bottom	Top	Bottom	Top	Bottom
Aug. 20, 1991	1	8	8	4.68	11.36	24.06	124.77
	2	8	7	2.38	9.38	14.99	80.89
	3	8	8	4.92	13.92	32.84	98.34
	4	8	7	5.89	4.63	20.74	18.23
	5	8	8	5.03	4.43	39.22	64.12
	6	8	8	3.86	3.77	12.56	28.42
Aug. 21, 1991	1	8	8	6.17	12.44	18.49	123.48
	2	8	8	3.07	4.34	10.59	29.86
	3	8	8	4.47	9.78	30.31	103.45
	4	8	8	6.98	21.04	52.00	76.74
	5	8	8	3.30	6.87	9.27	58.90
	6	8	8	5.01	5.14	23.79	69.73
Aug. 22, 1991	1	8	7	4.63	13.92	14.32	24.51
	2	8	8	4.57	6.16	14.69	37.64
	3	8	8	5.13	9.25	19.46	5.73
	4	8	8	8.12	15.26	31.01	16.86
	5	7	8	4.58	6.87	11.30	13.26
	6	8	8	3.96	6.35	12.10	11.71

Ground application rate on August 20-21 was 2.88 gal/acre and 5.76 gal/acre on August 22, 1991.

UNION CAMP SEED ORCHARD
CLAXTON, GA



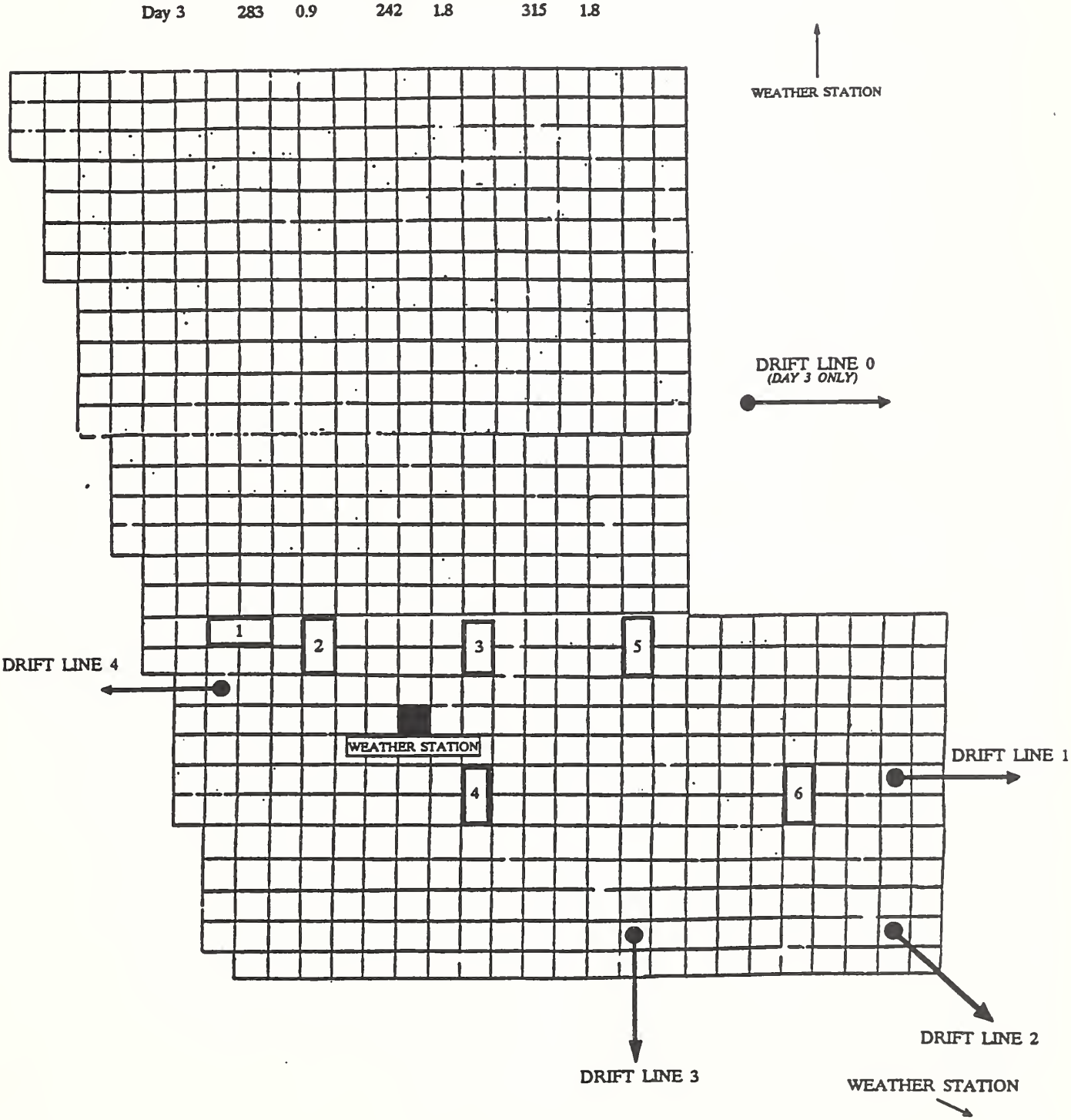
FKN = FRANKLIN COUNTY, VA
SAV = SAVANNA, GA
ALA = ALABAMA
R.R. = RUST RESISTANT
2G = SECOND GENERATION
OPEN = UNPLANTED AREA

Figure 1

Figure 2

DRIFT LINE/TREE LINE POSITIONS

		HANDAR 22 ft		HANDAR 55 ft		FOREST TECH 6 ft	
		DIR	SPEED	DIR	SPEED	DIR	SPEED
AIRCRAFT -	Day 1	238	3.1	244	3.8	270	5.3
	Day 2	277	0	281	0.4	315	3.3
	Day 3	344	5.5	273	1.9	270	0
GROUND -	Day 1	253	3.7	271	5.4	225	5.2
	Day 2	279	0.5	246	1.4	270	1.6
	Day 3	283	0.9	242	1.8	315	1.8



CESSNA AG TRUCK SHOWING APPROXIMATE NOZZLE LOCATIONS

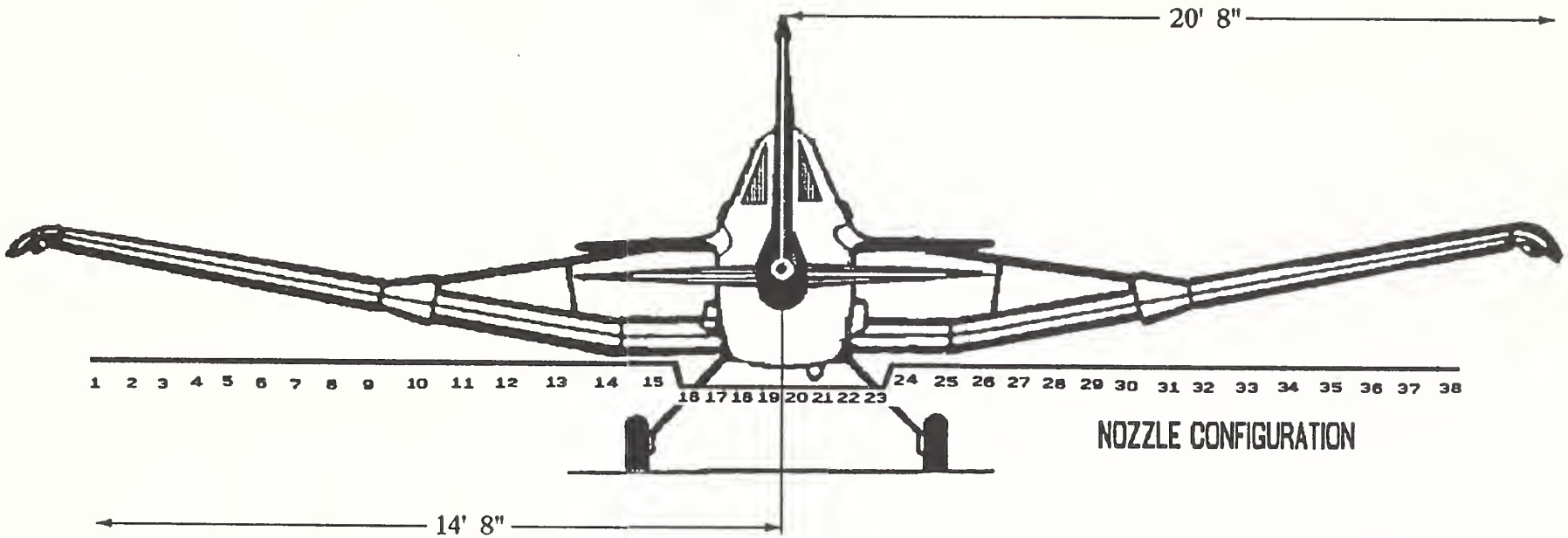
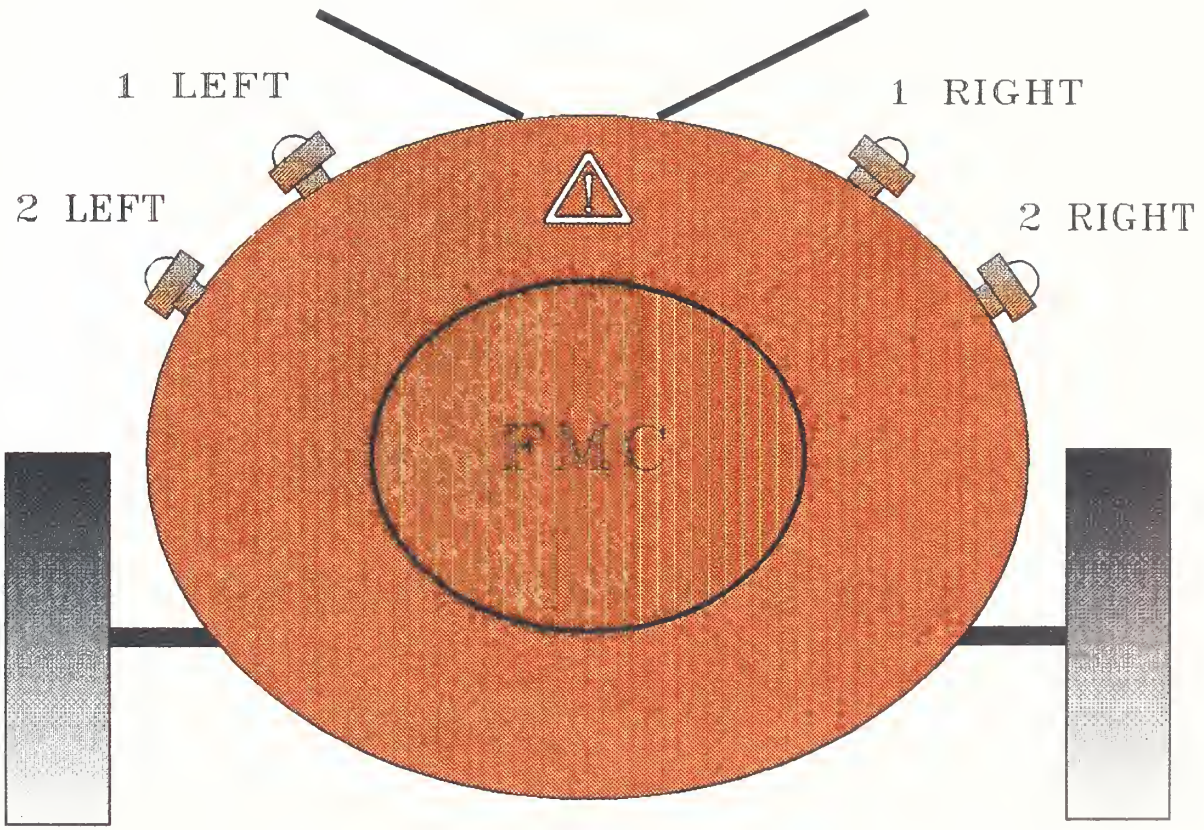


Figure 3

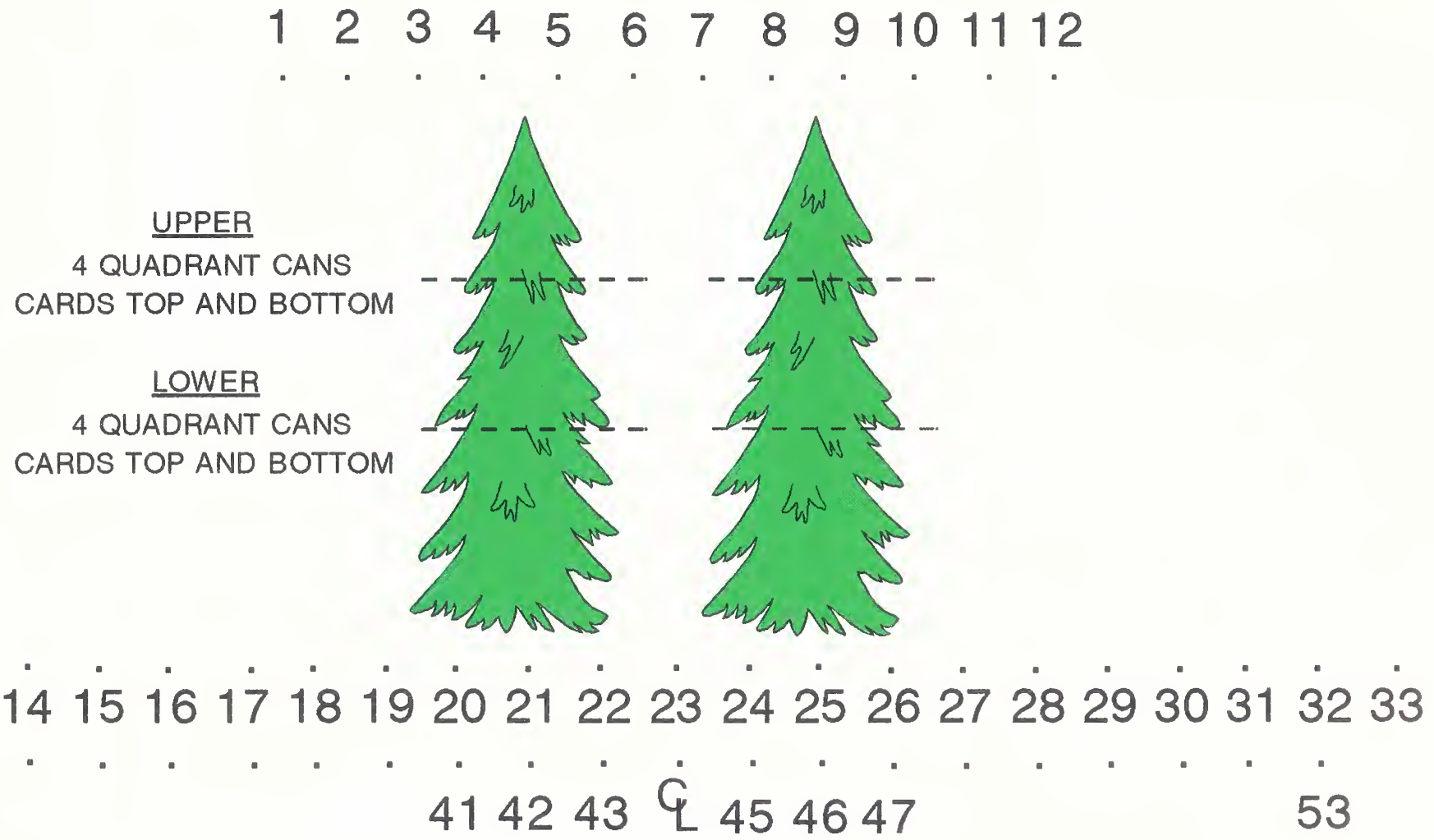
FMC 757 CP SPEED SPRAYER
SETUP FOR CLAXTON SPRAY TRIALS
AUGUST 20-22, 1991



AUGUST 20 & 21 - NOZZLES 1 LEFT & 1 RIGHT WERE USED
AUGUST 22 - NOZZLES 1 LEFT, 2 LEFT, 1 RIGHT, 2 RIGHT WERE USED

Figure 4

SPRAY DEPOSITION SAMPLER PLACEMENT
CLAXTON SPRAY TRIALS, AUGUST 1991



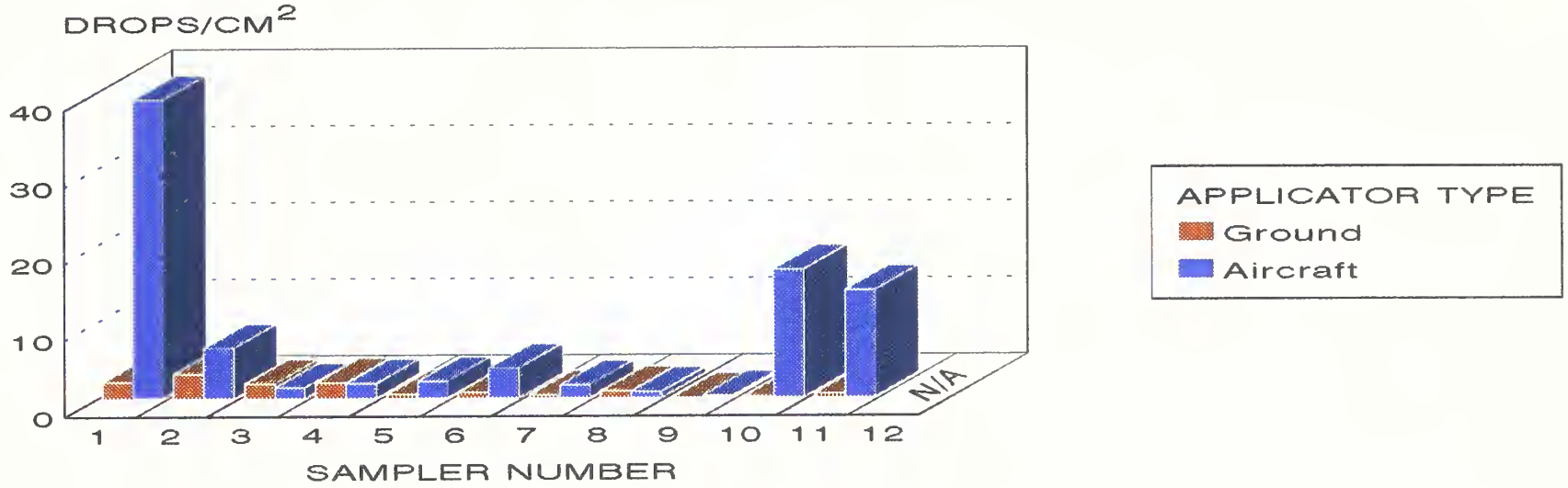
TREE SPACING = 22 ft
CARD SPACING = 5 ft

Figure 5

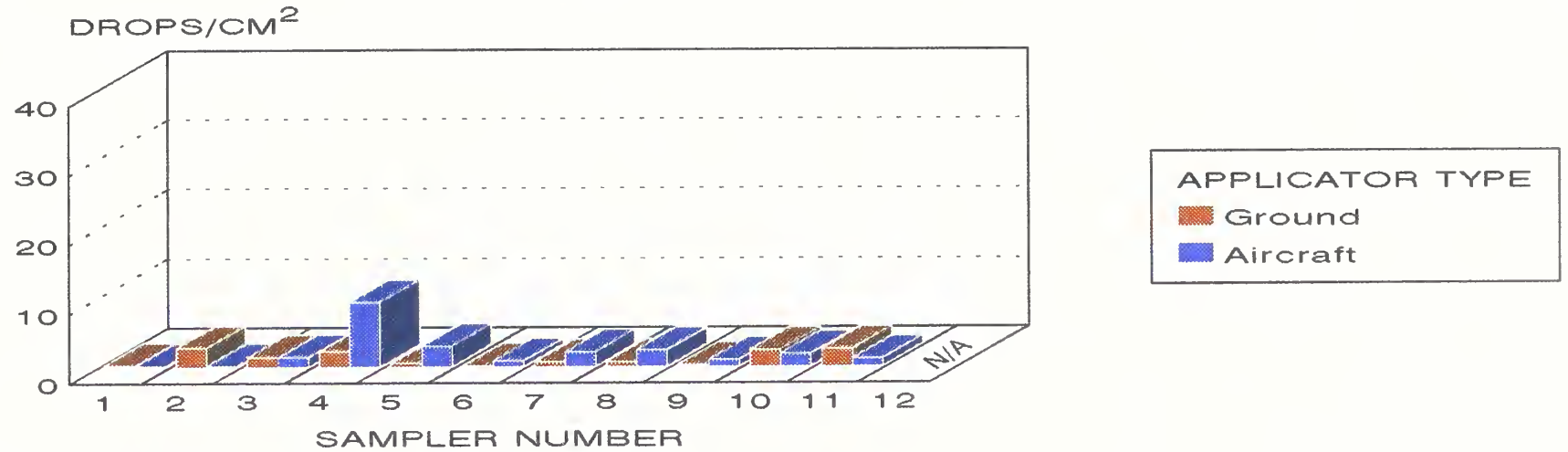
CLAXTON SPRAY TRIALS

DAY 1

TREE LINE 1 - TOP



TREE LINE 1 - BOTTOM



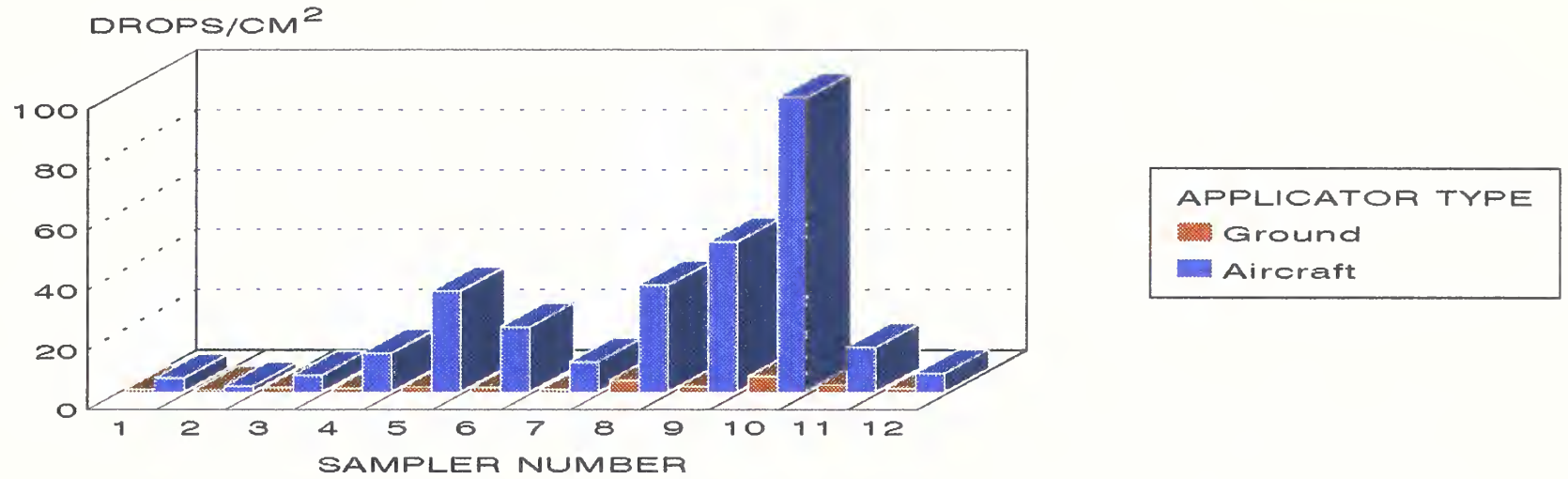
AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 6

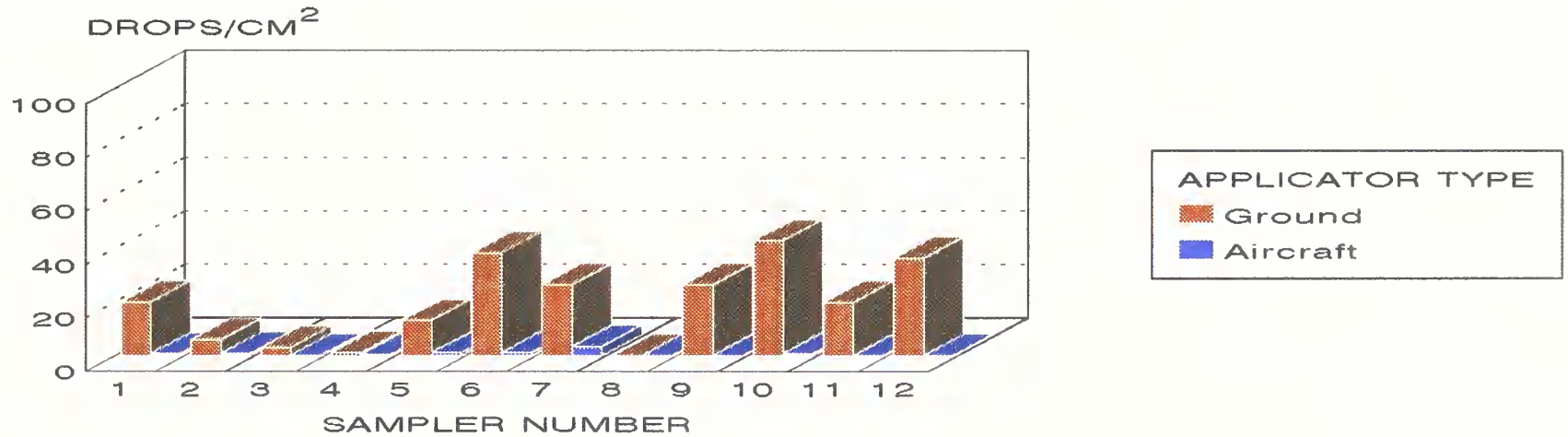
CLAXTON SPRAY TRIALS

DAY 1

TREE LINE 2 - TOP



TREE LINE 2 - BOTTOM



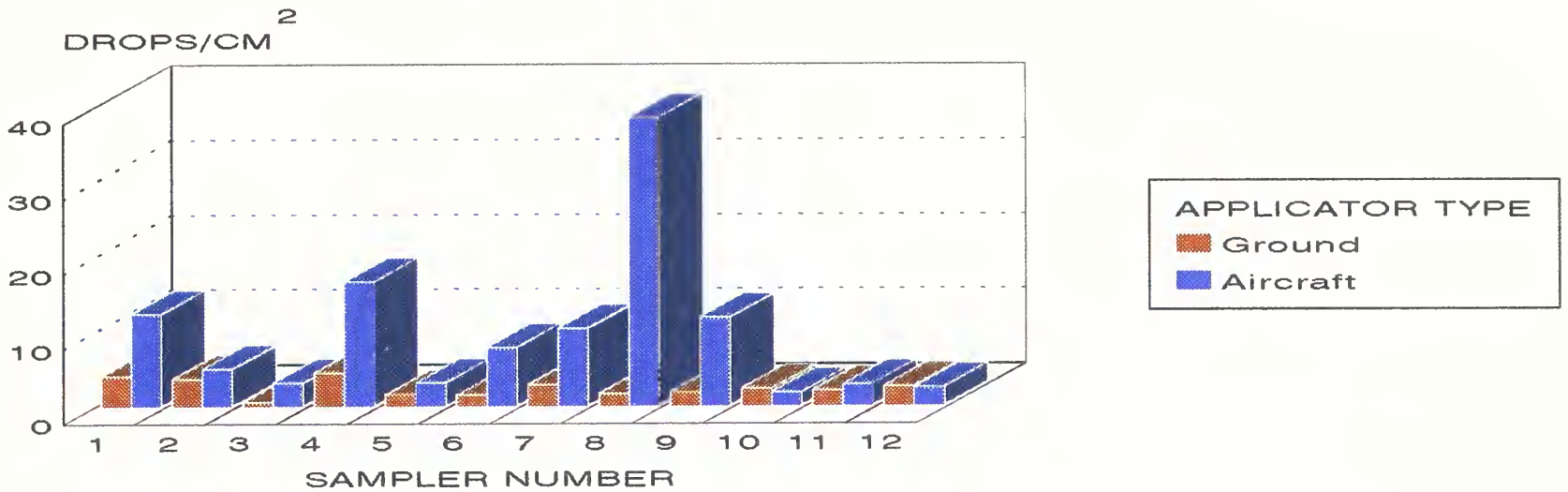
AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 7

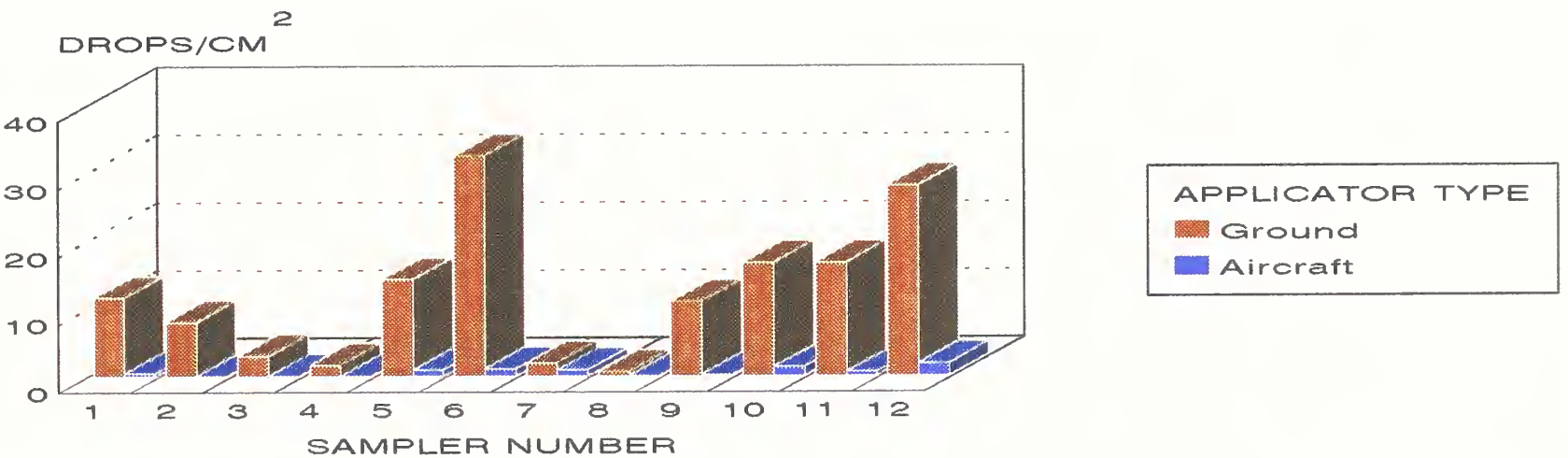
CLAXTON SPRAY TRIALS

DAY 1

TREE LINE 3 - TOP



TREE LINE 3 - BOTTOM



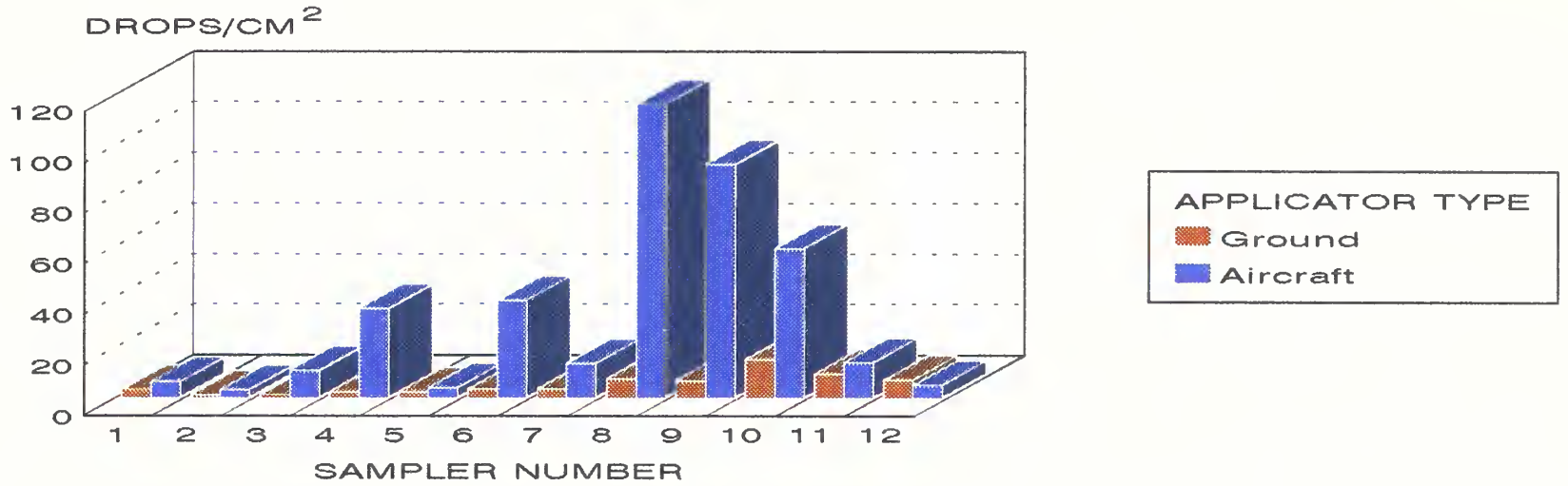
AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 8

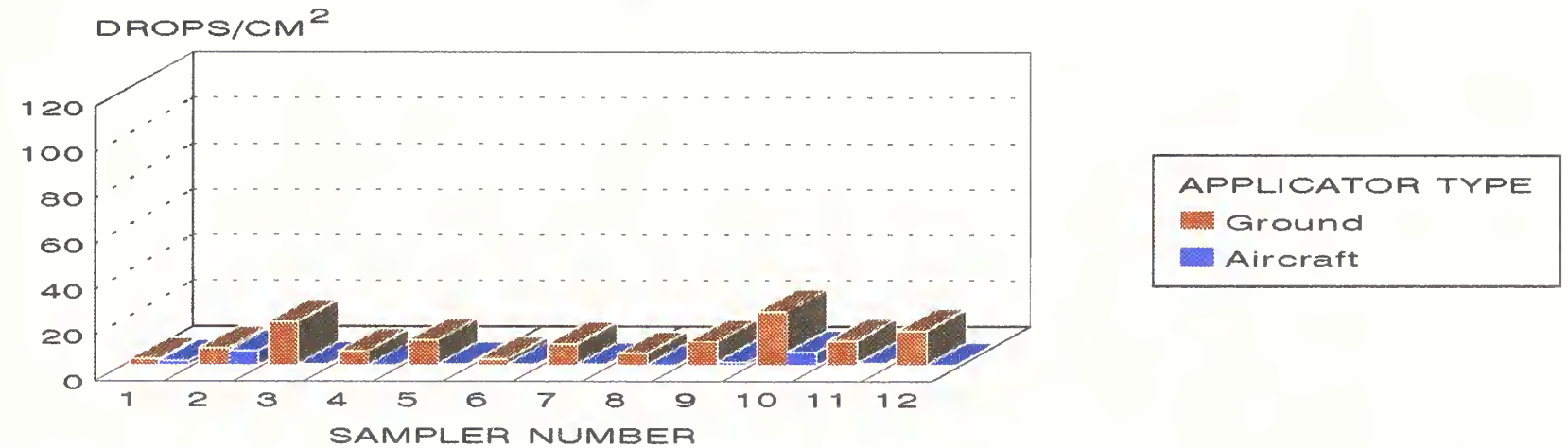
CLAXTON SPRAY TRIALS

DAY 1

TREE LINE 4 - TOP



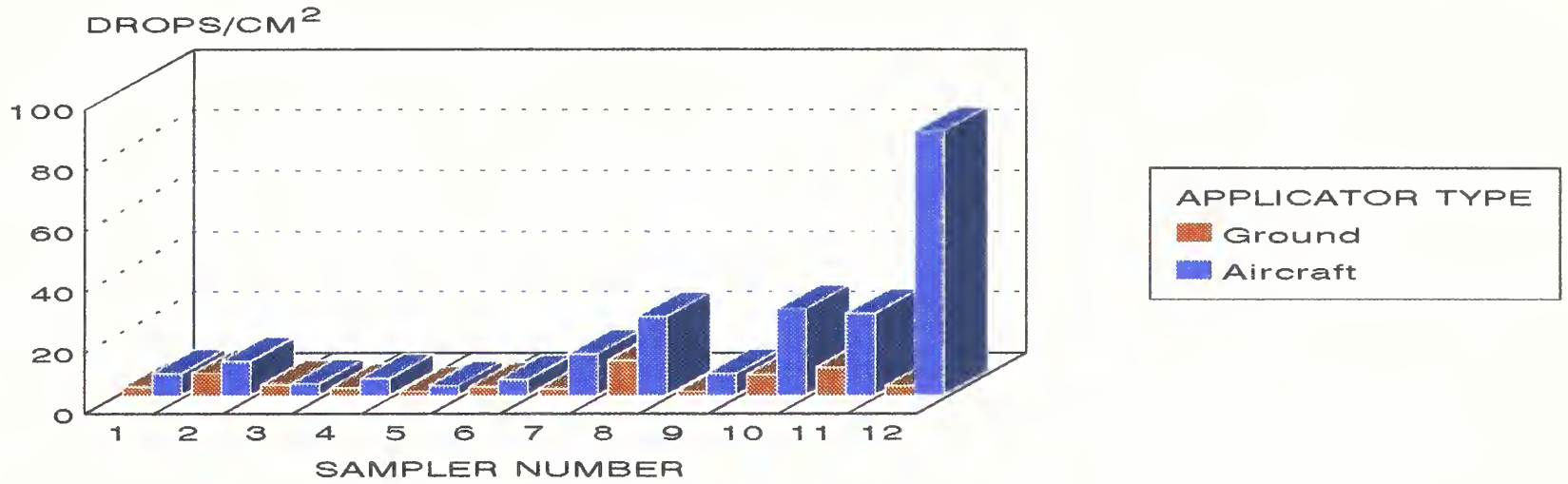
TREE LINE 4 - BOTTOM



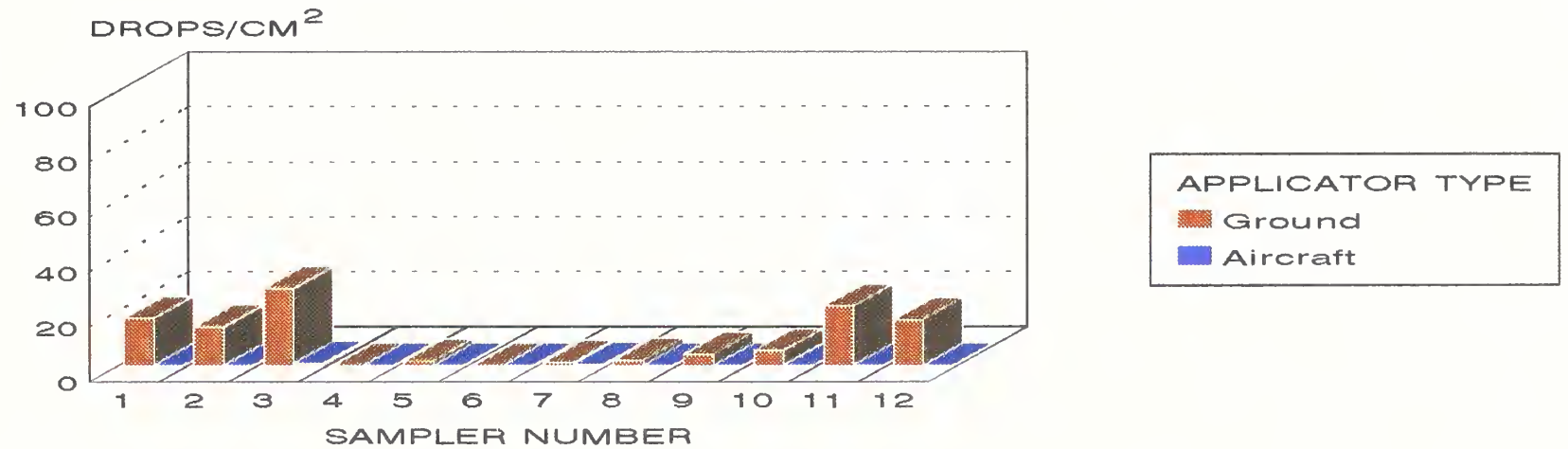
AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 9

CLAXTON SPRAY TRIALS
DAY1
TREE LINE 5 - TOP



TREE LINE 5 - BOTTOM



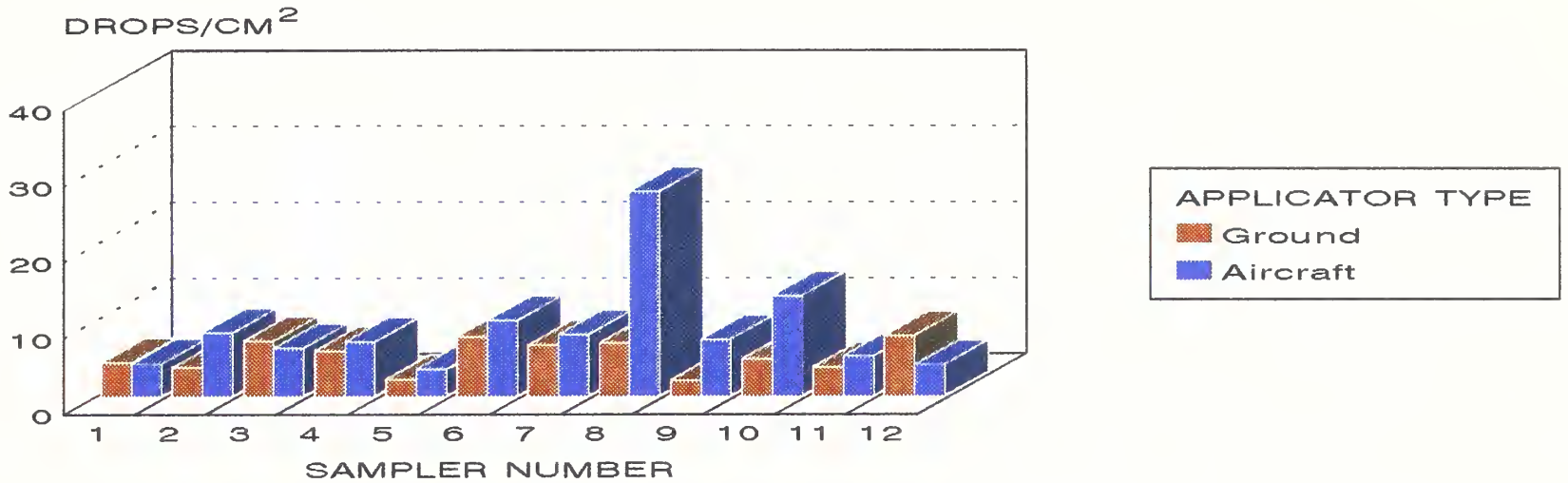
AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 10

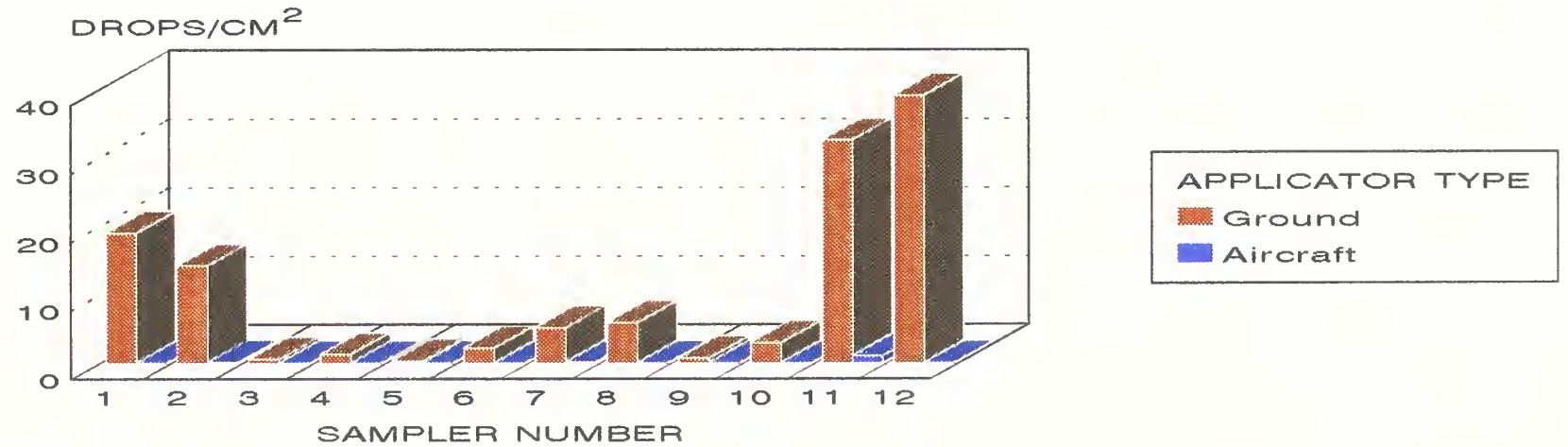
CLAXTON SPRAY TRIALS

DAY 1

TREE LINE 6 - TOP



TREE LINE 6 - BOTTOM



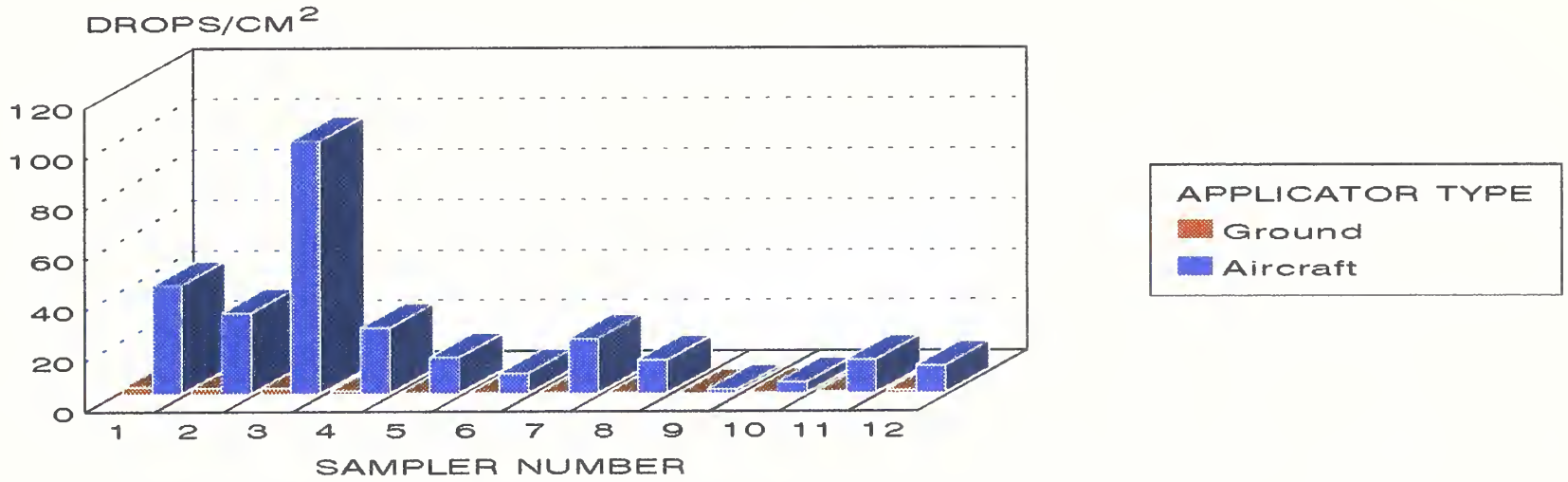
AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 11

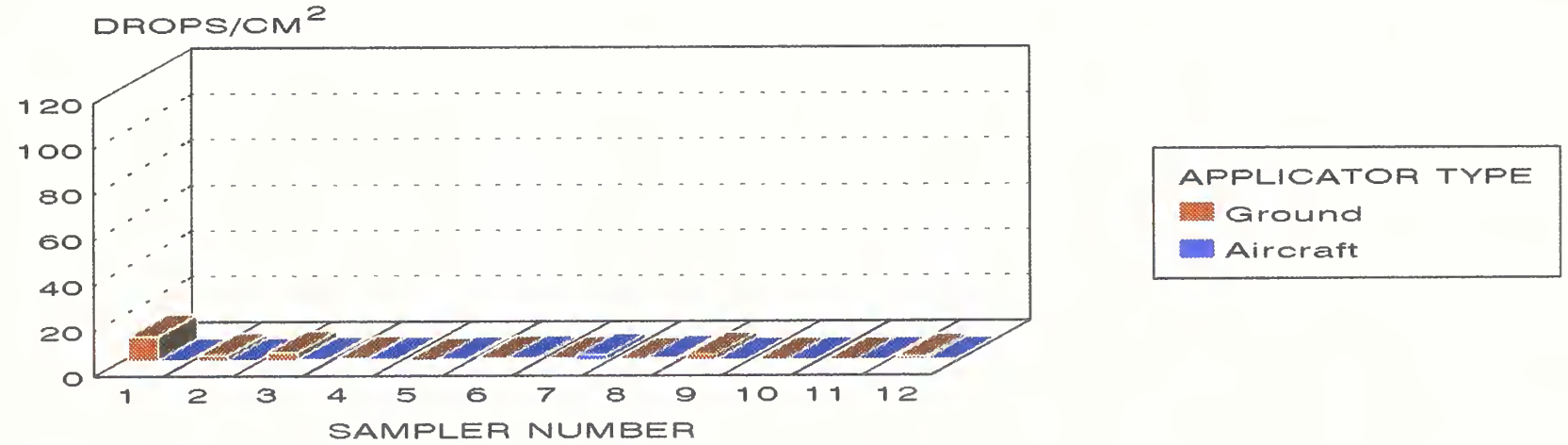
CLAXTON SPRAY TRIALS

DAY 2

TREE LINE 1 - TOP



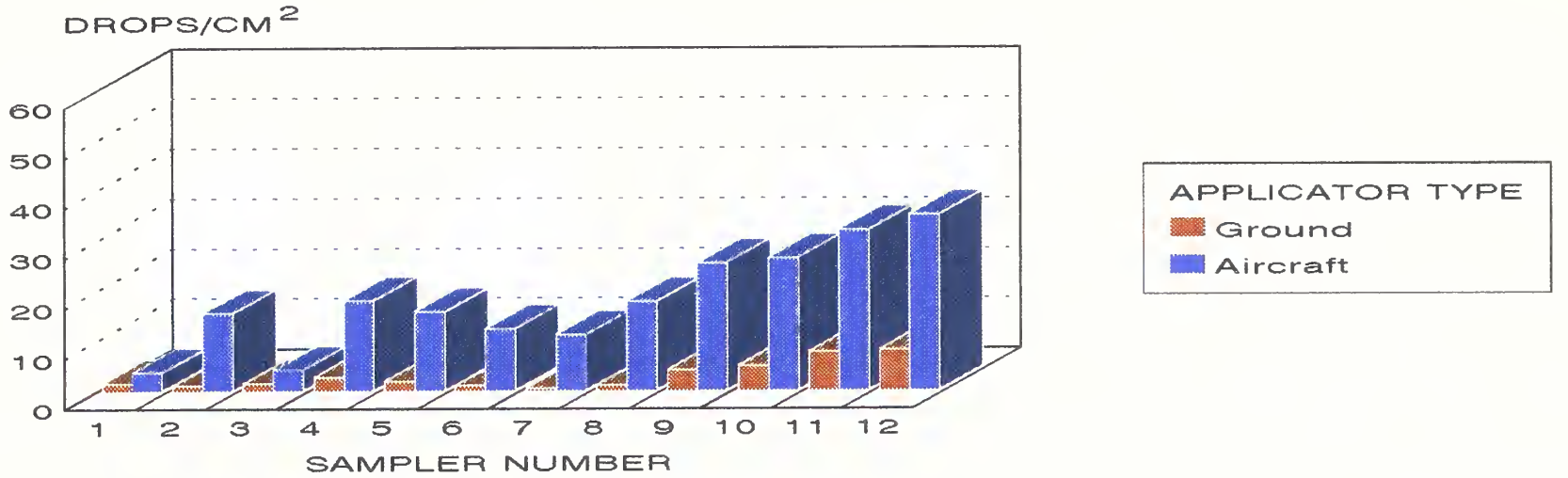
TREE LINE 1 - BOTTOM



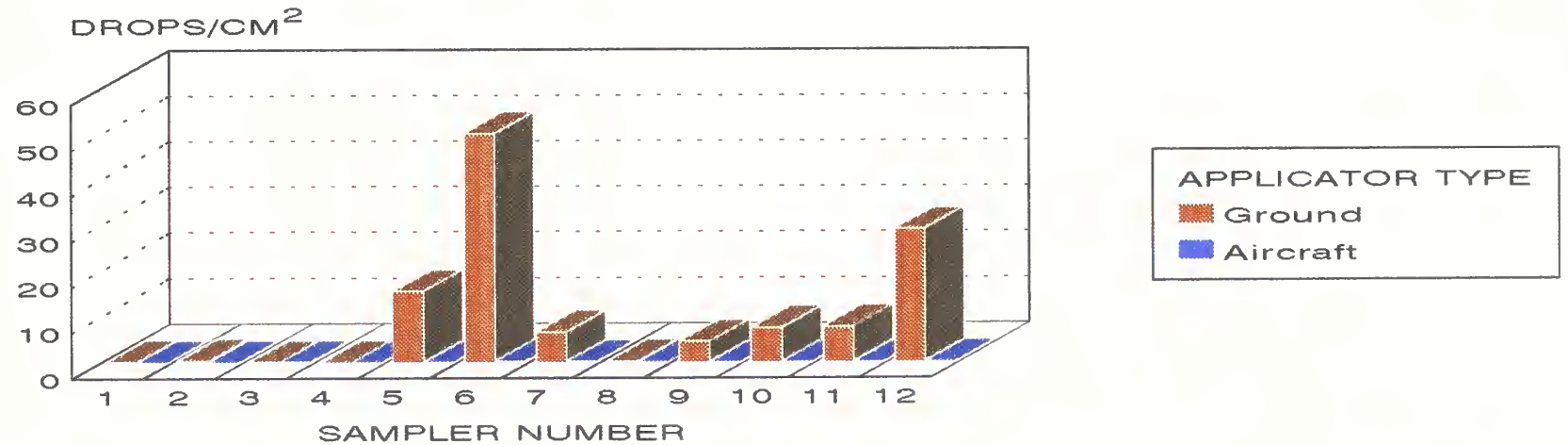
AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 12

CLAXTON SPRAY TRIALS
DAY 2
TREE LINE 2 - TOP



TREE LINE 2 - BOTTOM



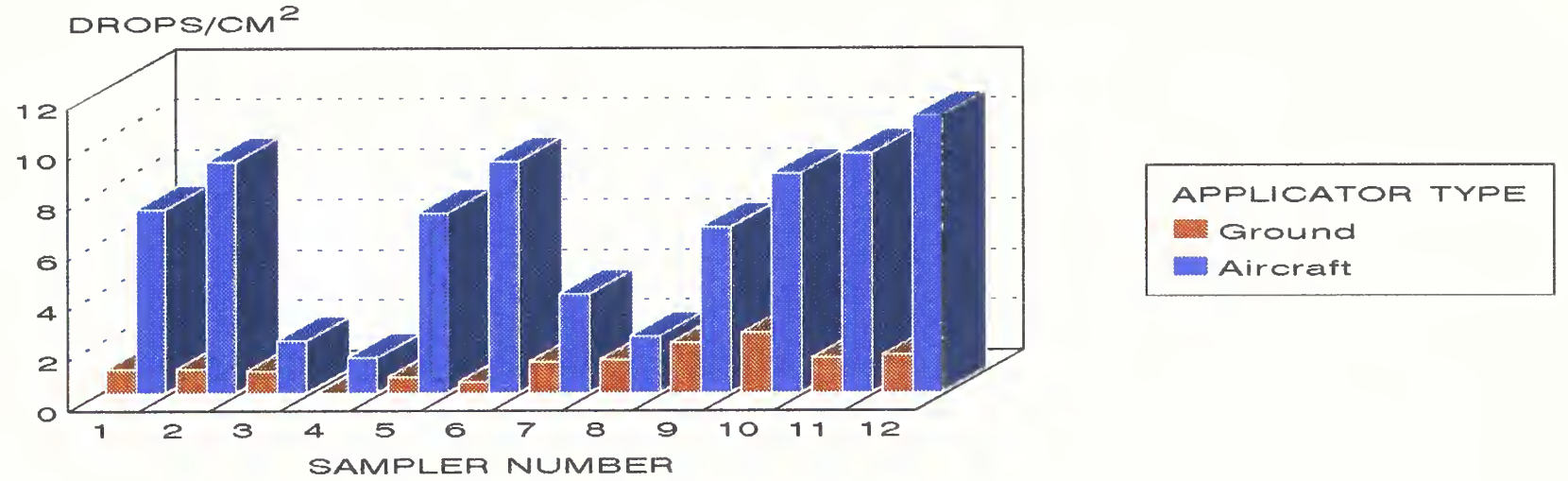
AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 13

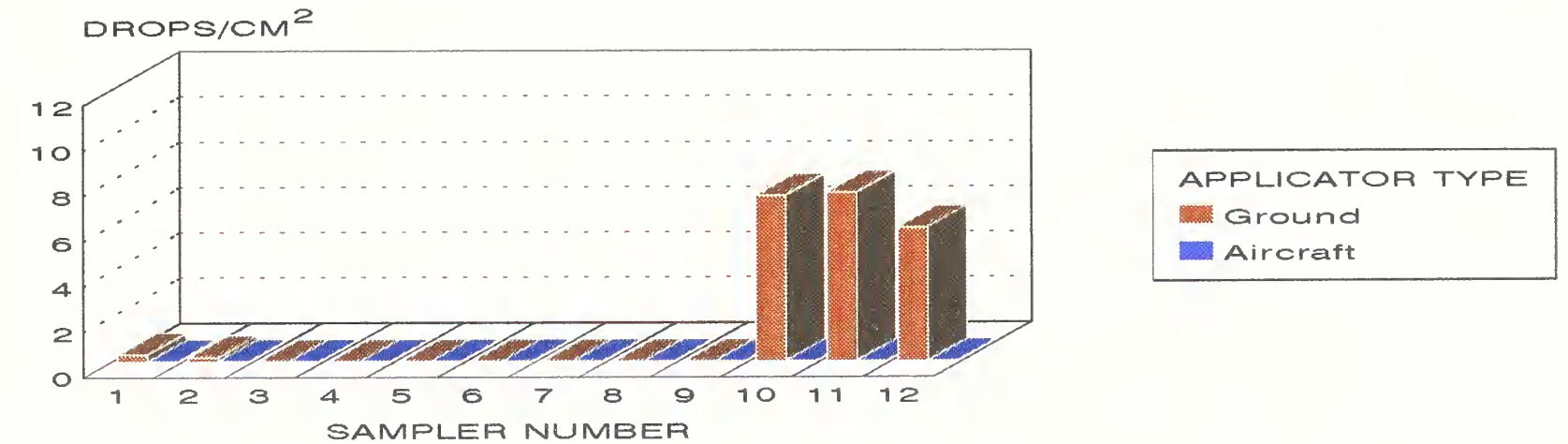
CLAXTON SPRAY TRIALS

DAY 2

TREE LINE 3 - TOP



TREE LINE 3 - BOTTOM



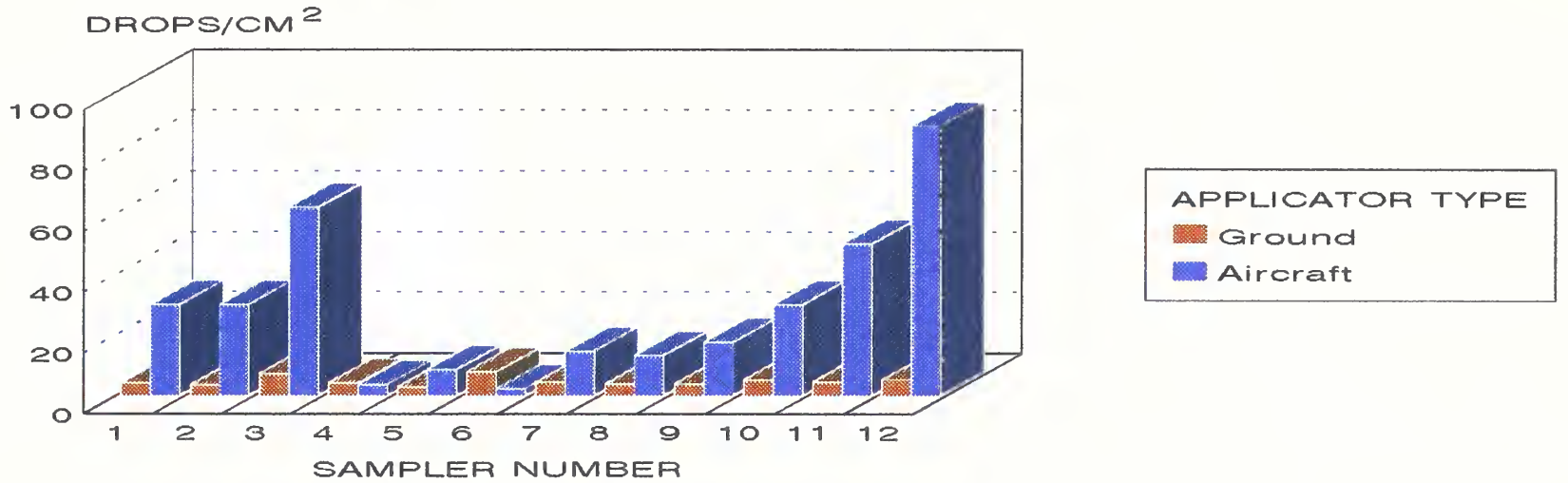
AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 14

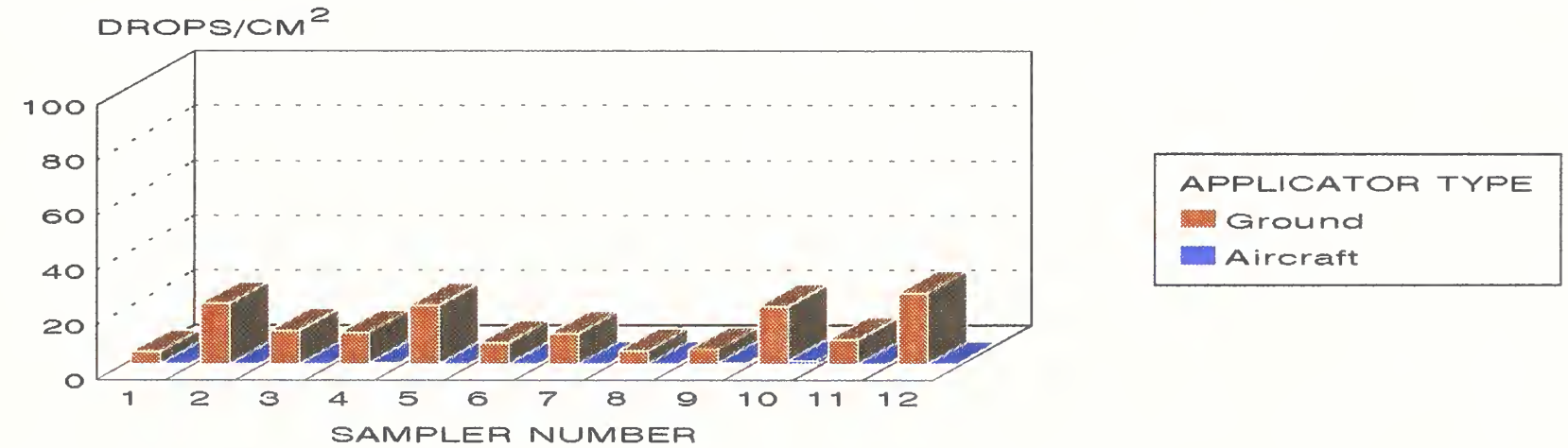
CLAXTON SPRAY TRIALS

DAY 2

TREE LINE 4 - TOP



TREE LINE 4 - BOTTOM



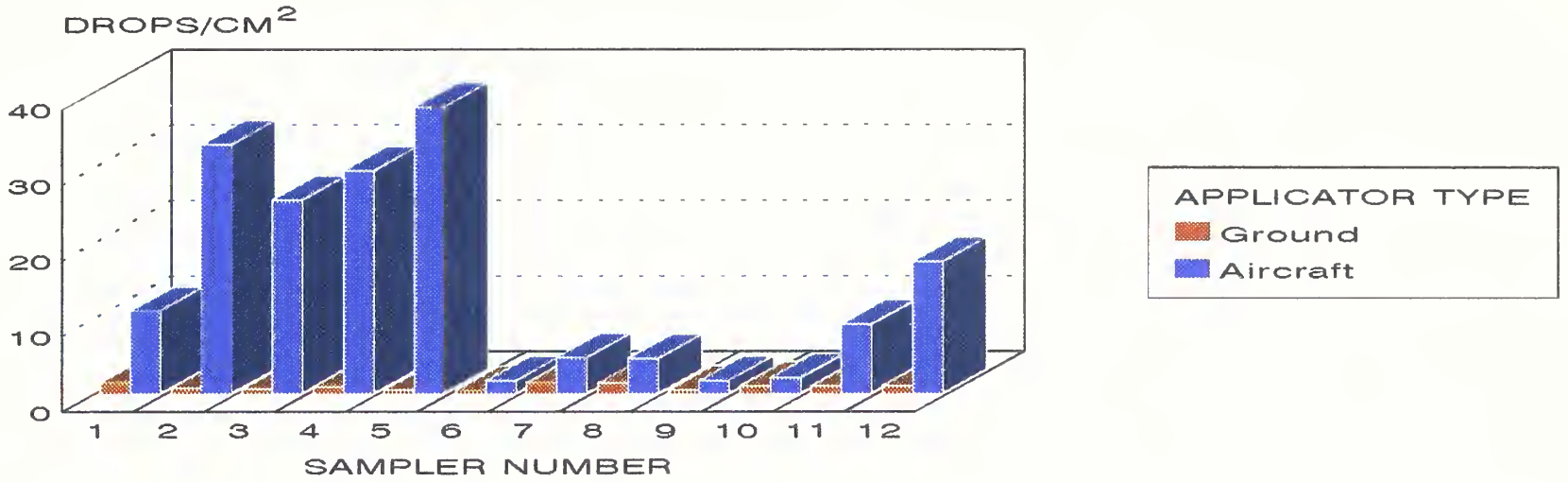
AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 15

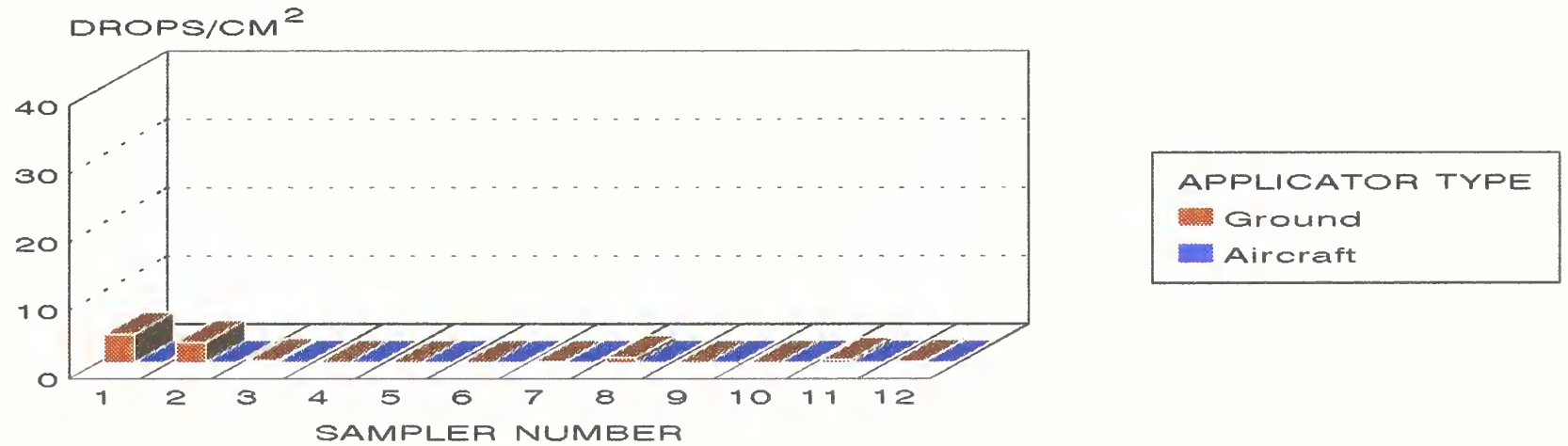
CLAXTON SPRAY TRIALS

DAY 2

TREE LINE 5 - TOP



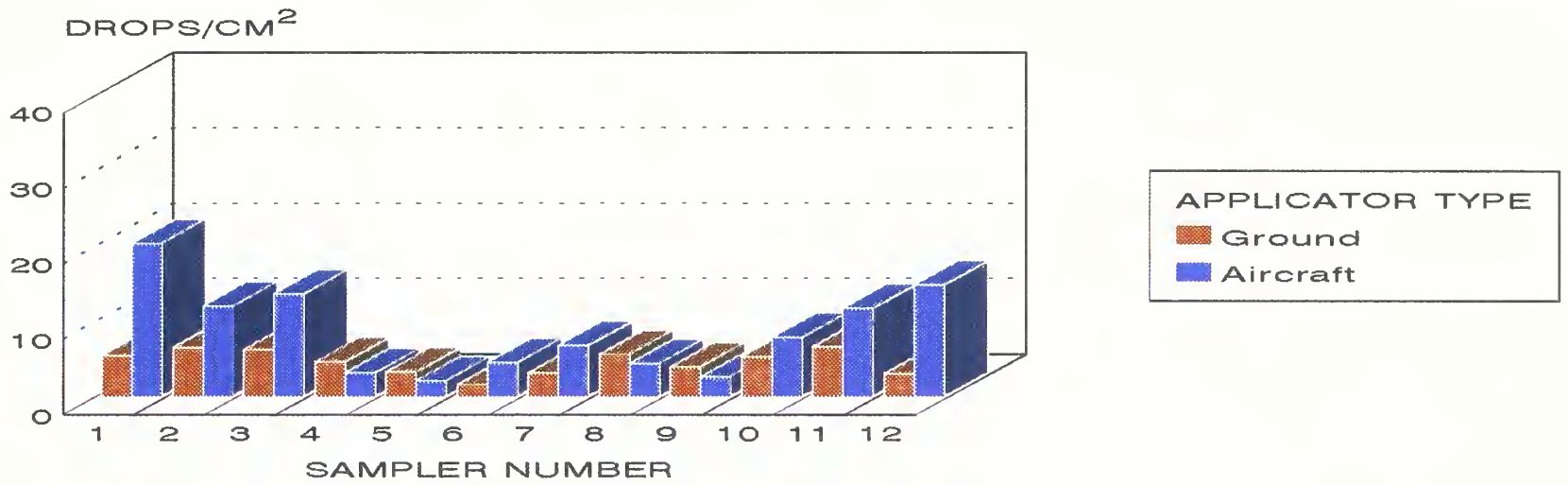
TREE LINE 5 - BOTTOM



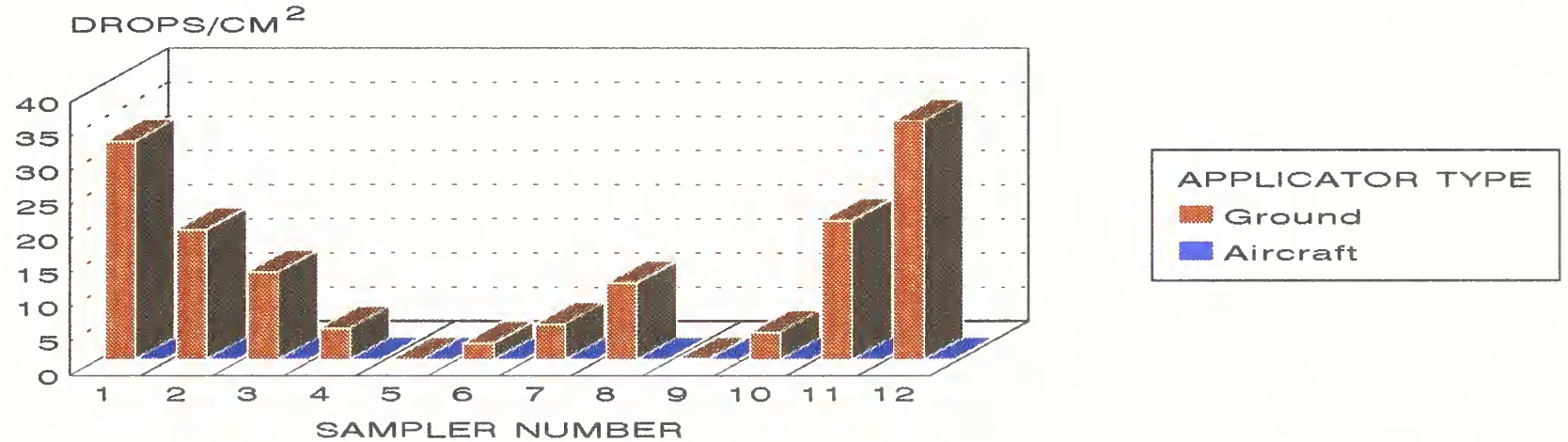
AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 16

CLAXTON SPRAY TRIALS
DAY 2
TREE LINE 6 - TOP



TREE LINE 6 - BOTTOM



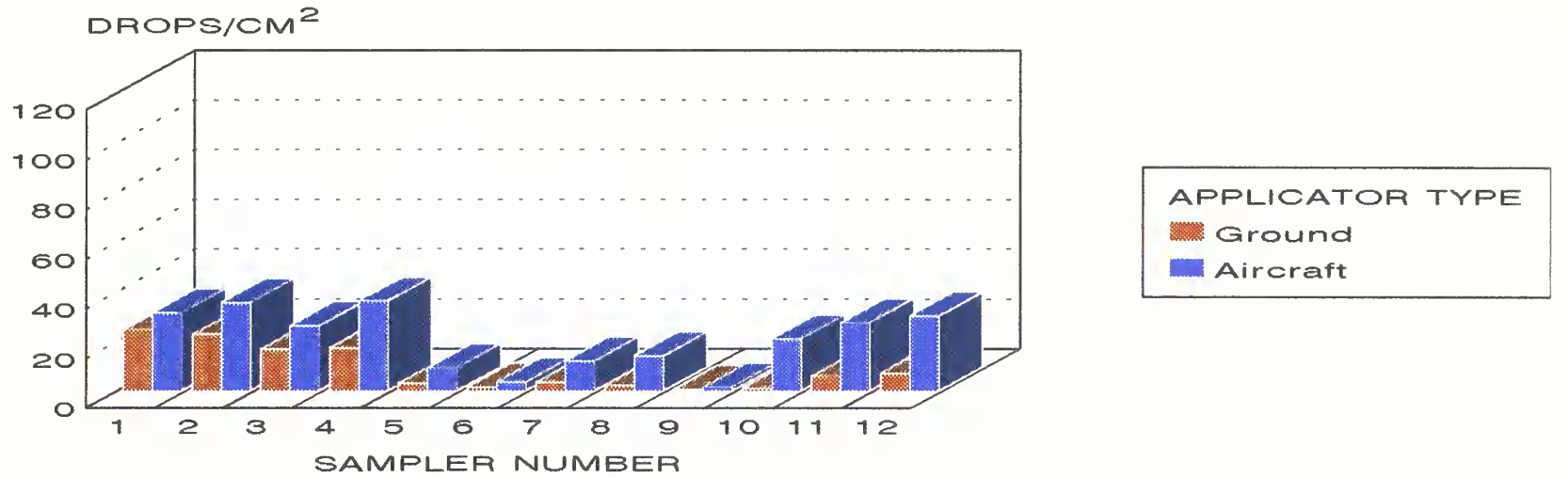
AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 17

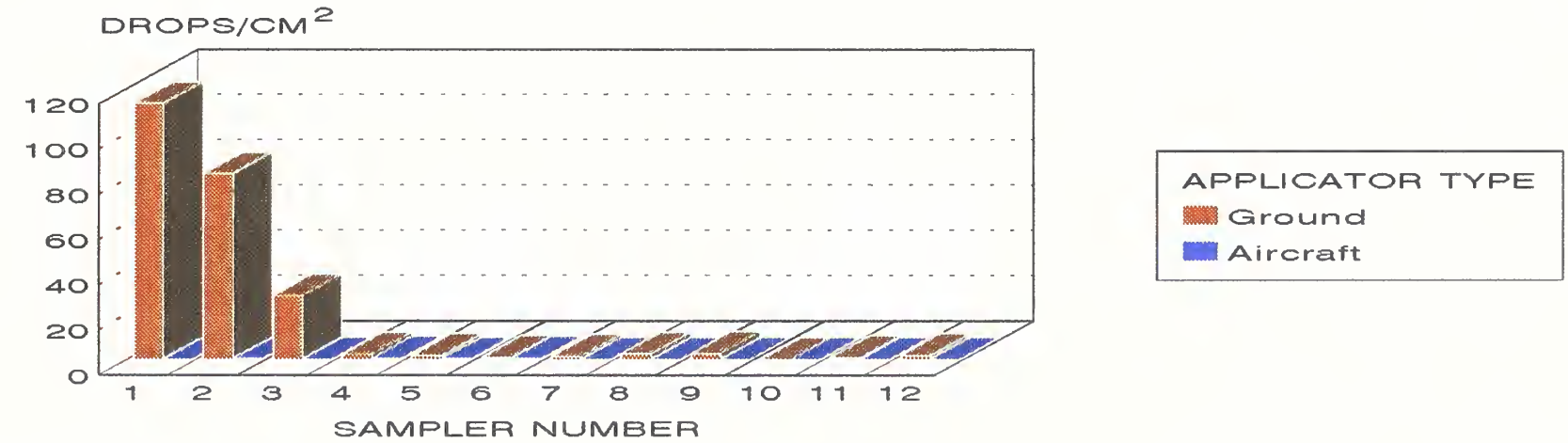
CLAXTON SPRAY TRIALS

DAY 3

TREE LINE 1 - TOP



TREE LINE 1 - BOTTOM



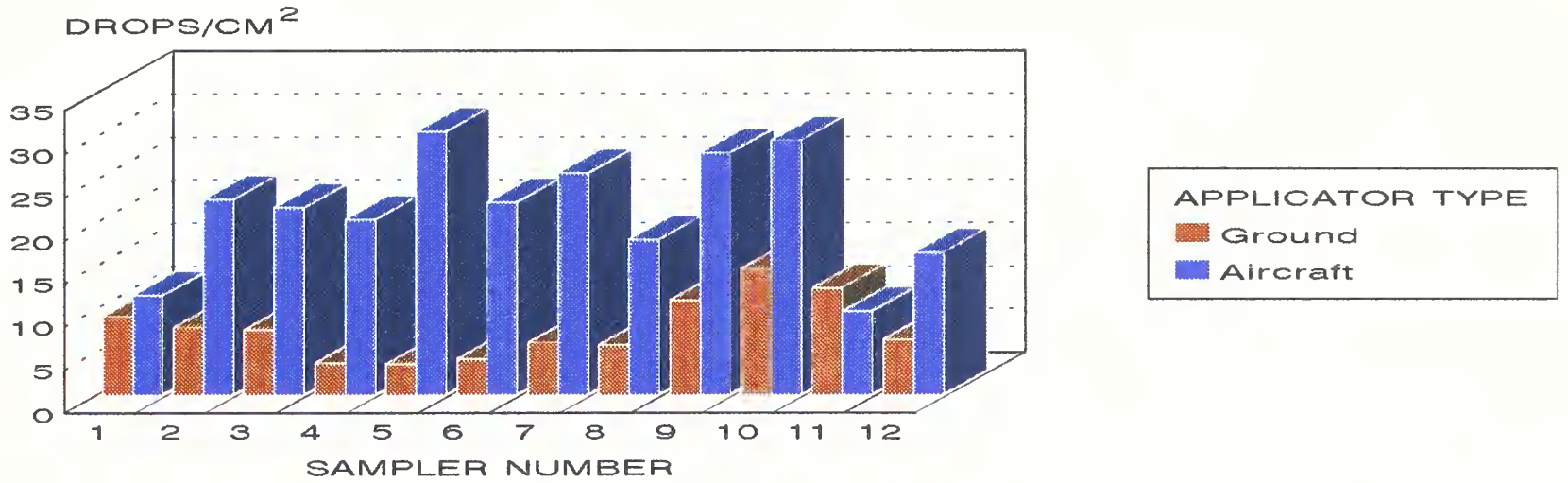
AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 18

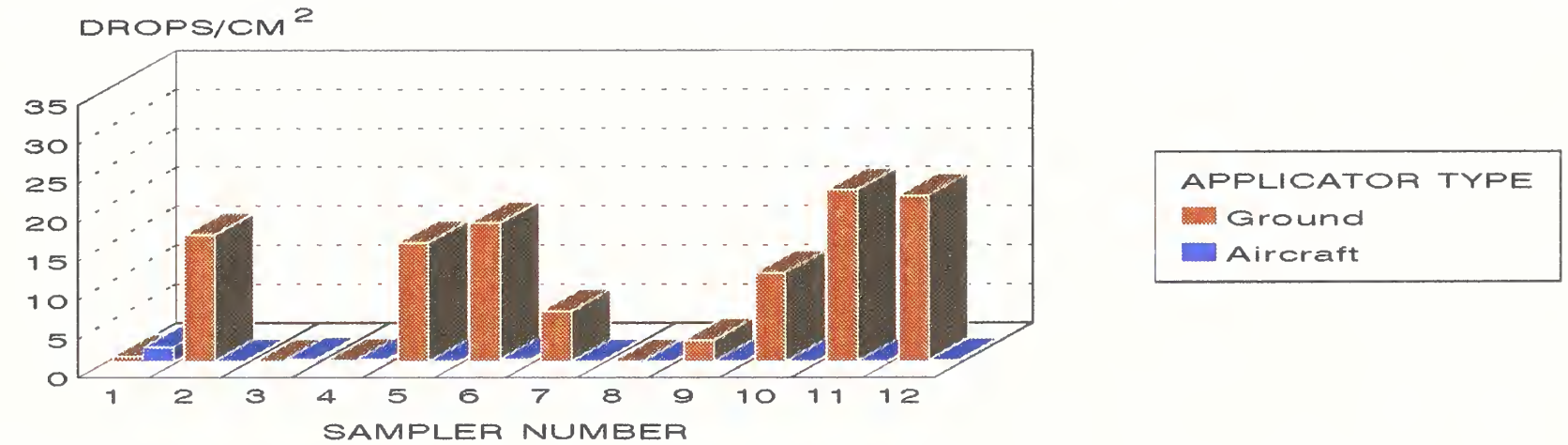
CLAXTON SPRAY TRIALS

DAY 3

TREE LINE 2 - TOP



TREE LINE 2 - BOTTOM



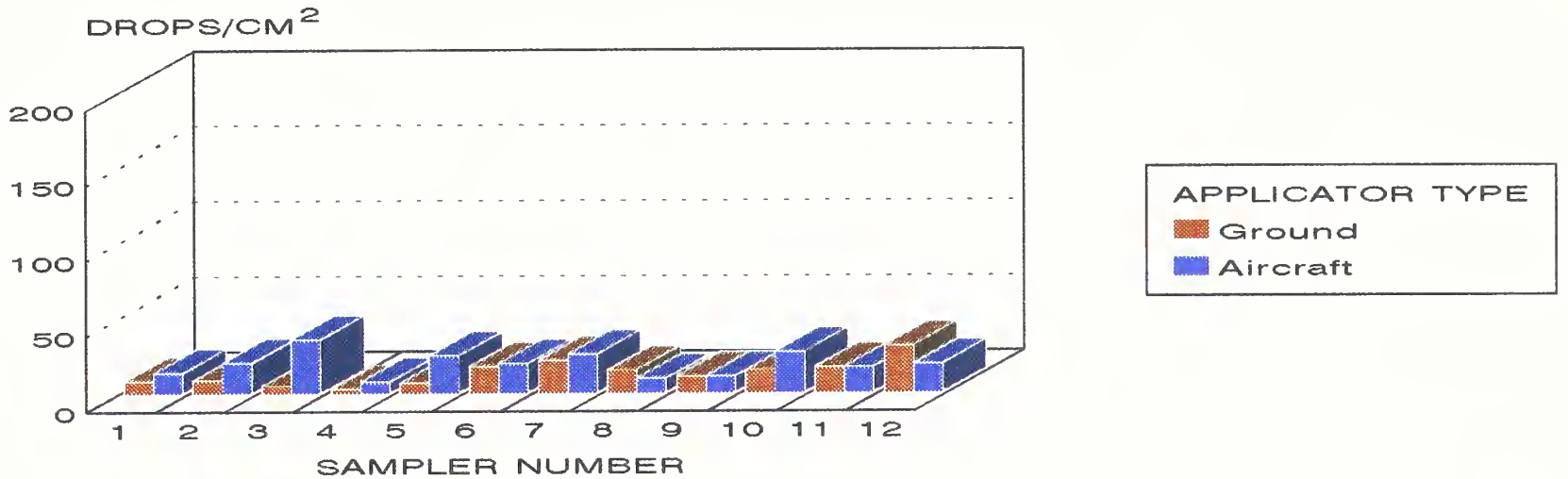
AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 19

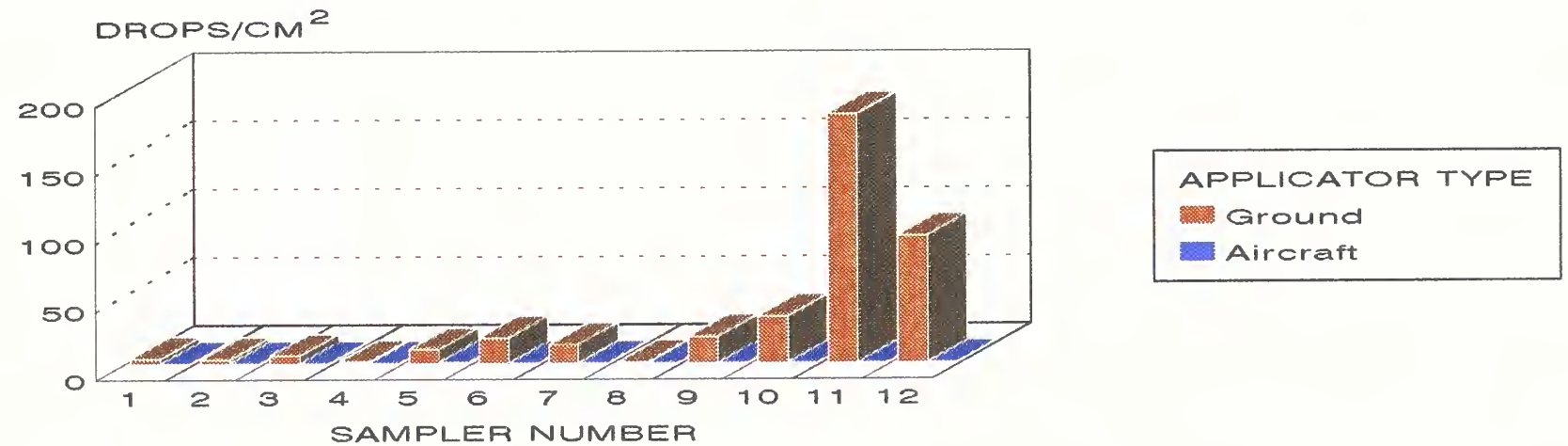
CLAXTON SPRAY TRIALS

DAY 3

TREE LINE 3 - TOP



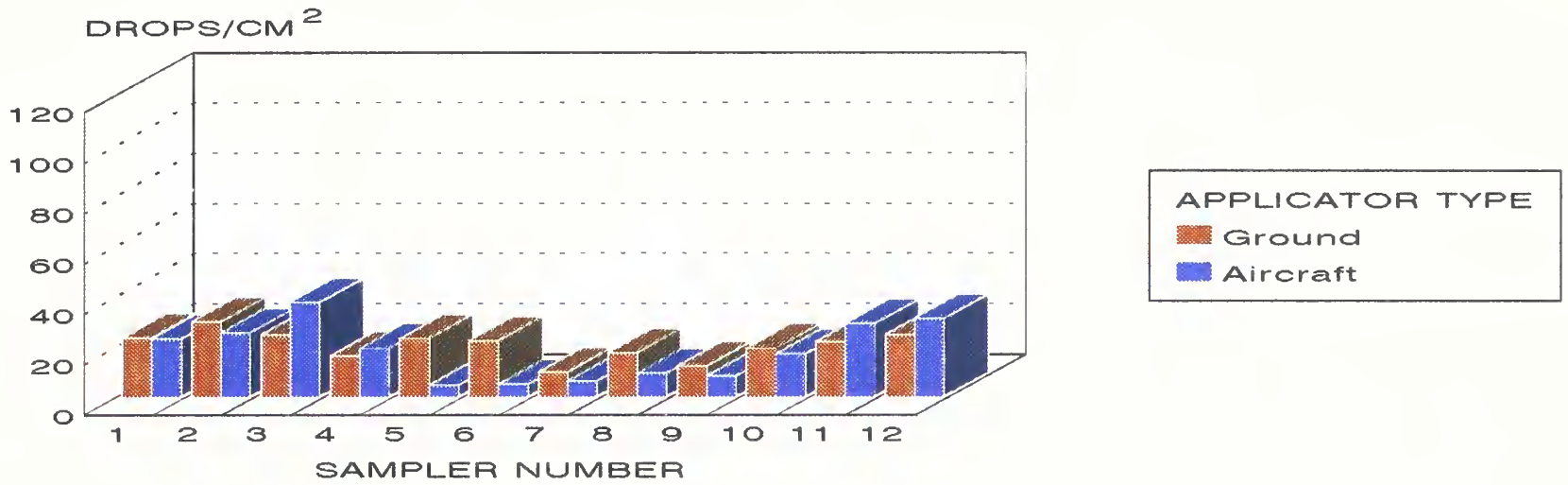
TREE LINE 3 - BOTTOM



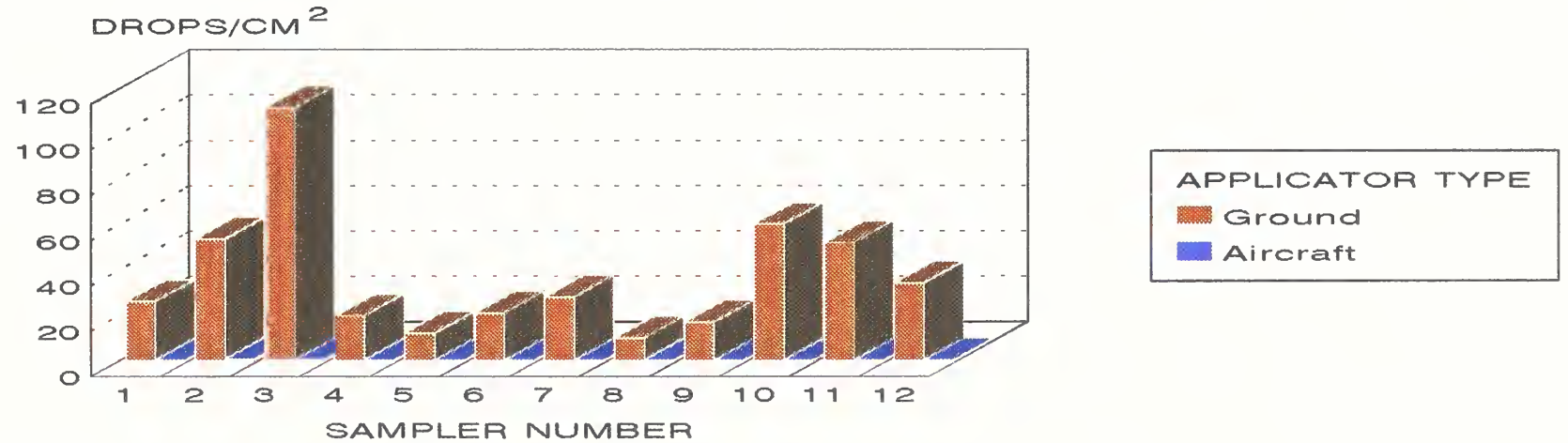
AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 20

CLAXTON SPRAY TRIALS
DAY 3
TREE LINE 4 - TOP



TREE LINE 4 - BOTTOM



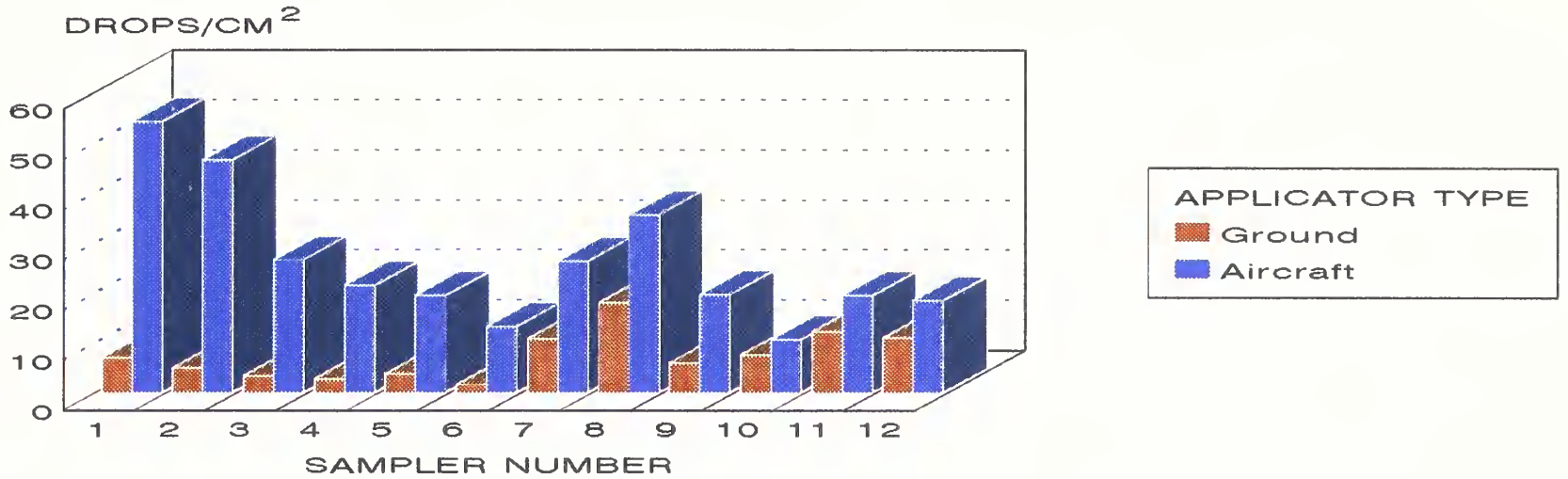
AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 21

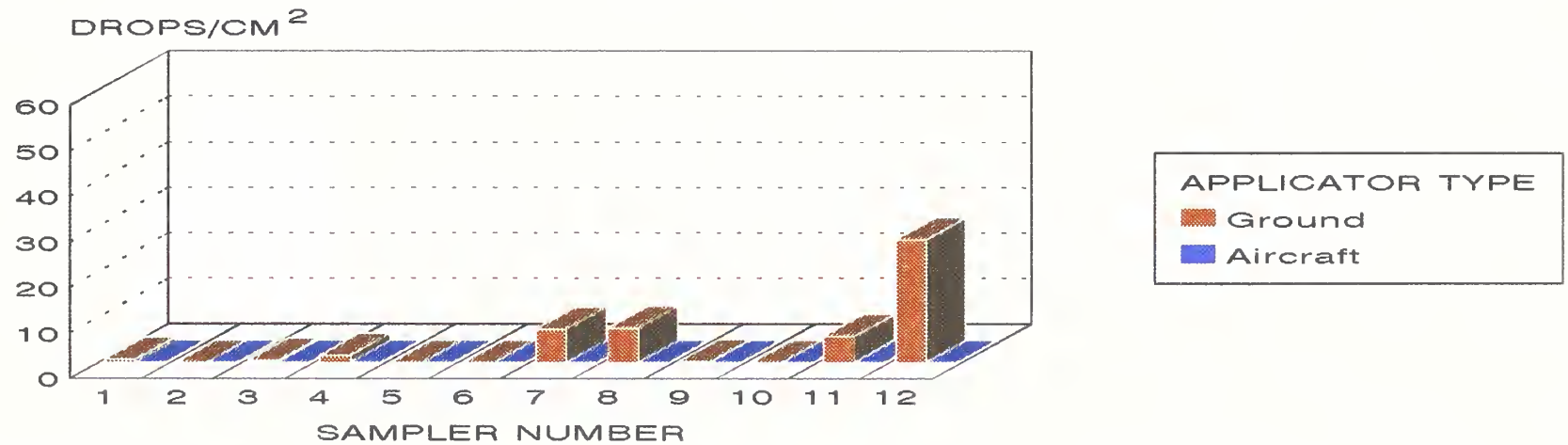
CLAXTON SPRAY TRIALS

DAY 3

TREE LINE 5 - TOP



TREE LINE 5 - BOTTOM



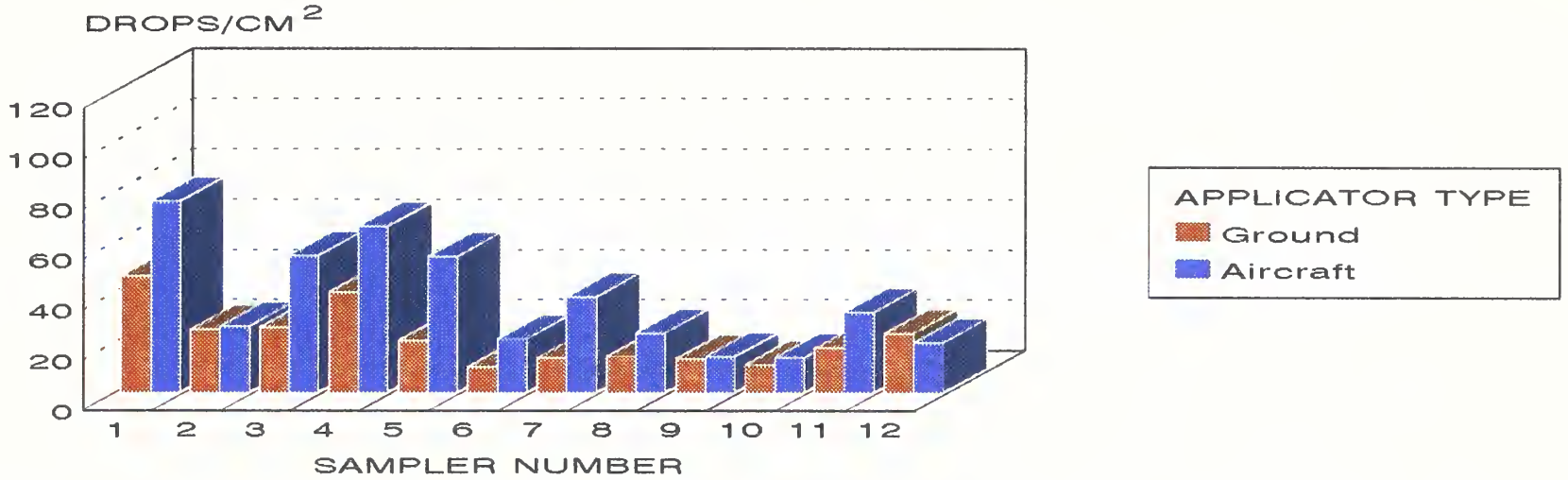
AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 22

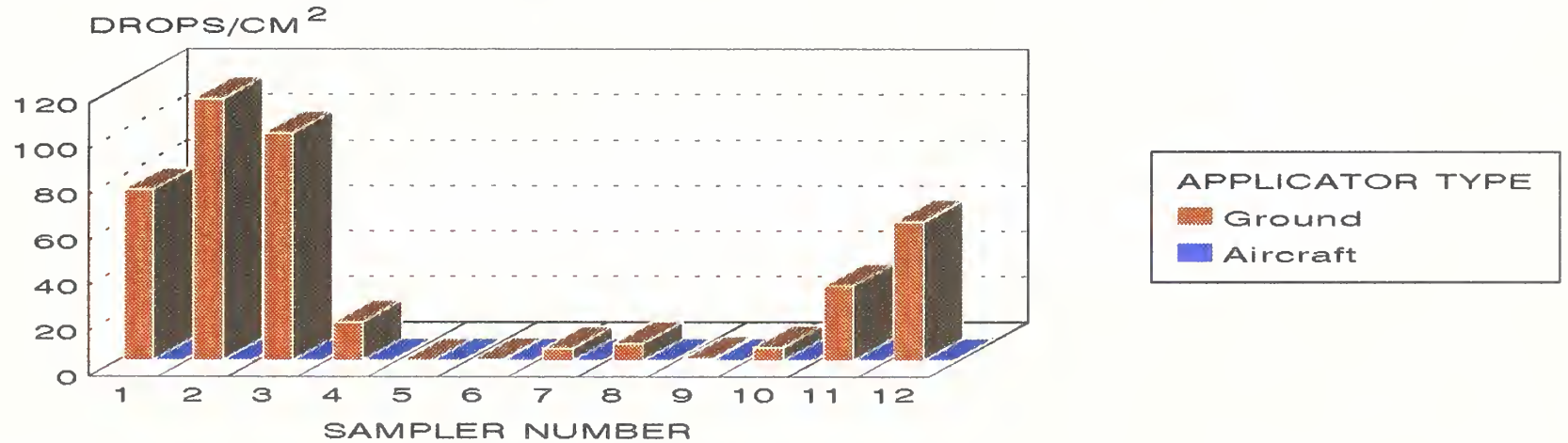
CLAXTON SPRAY TRIALS

DAY 3

TREE LINE 6 - TOP



TREE LINE 6 - BOTTOM

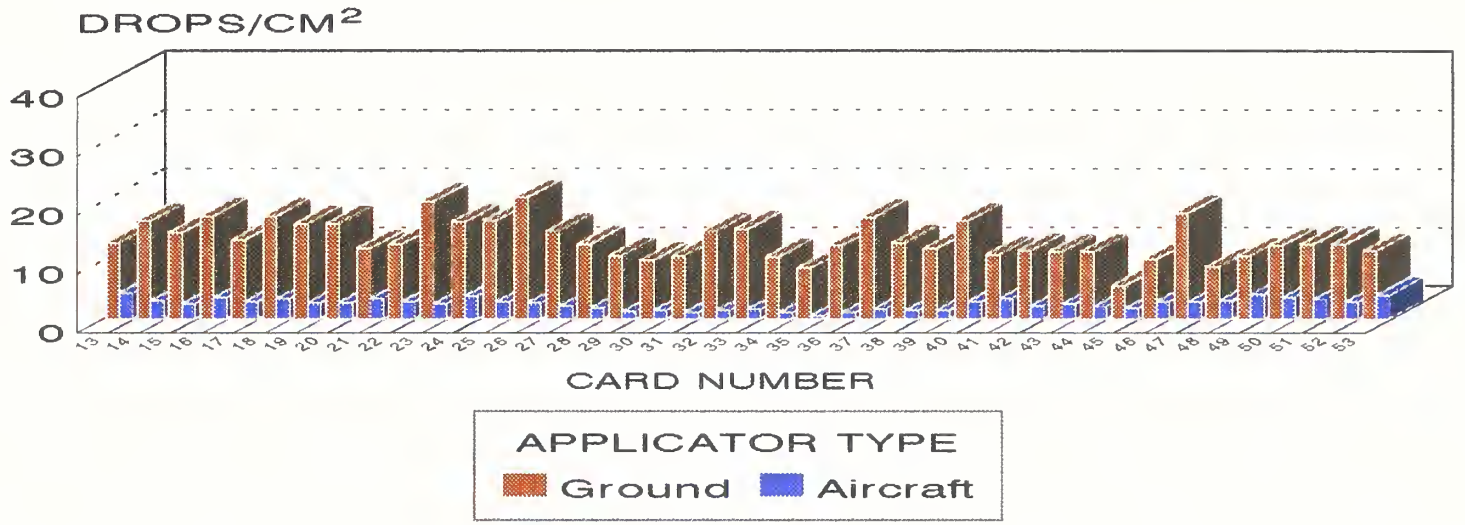


AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

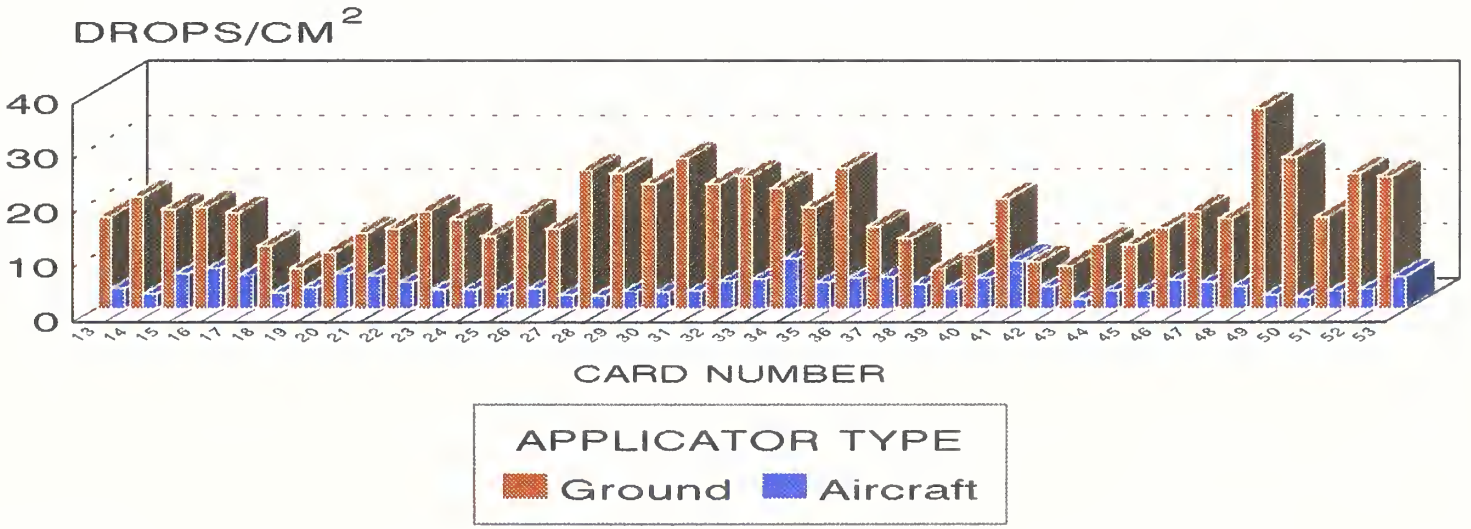
Figure 23

CLAXTON SPRAY TRIALS

DAY 1
GROUND LINE 1



DAY 1
GROUND LINE 2

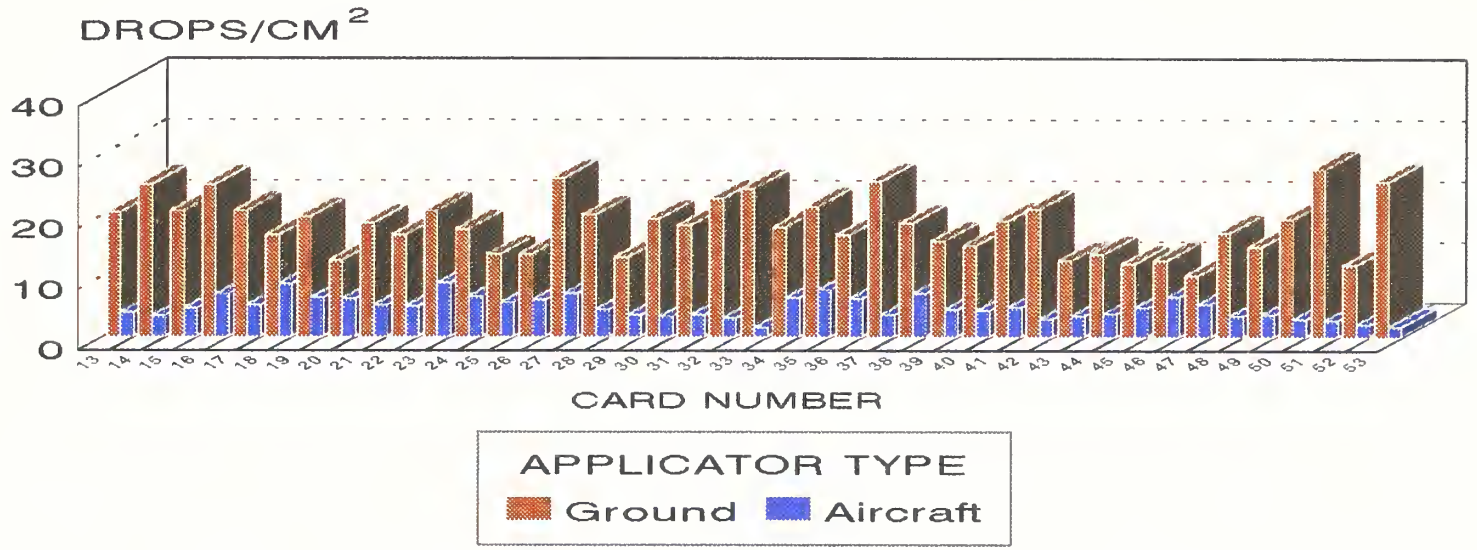


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

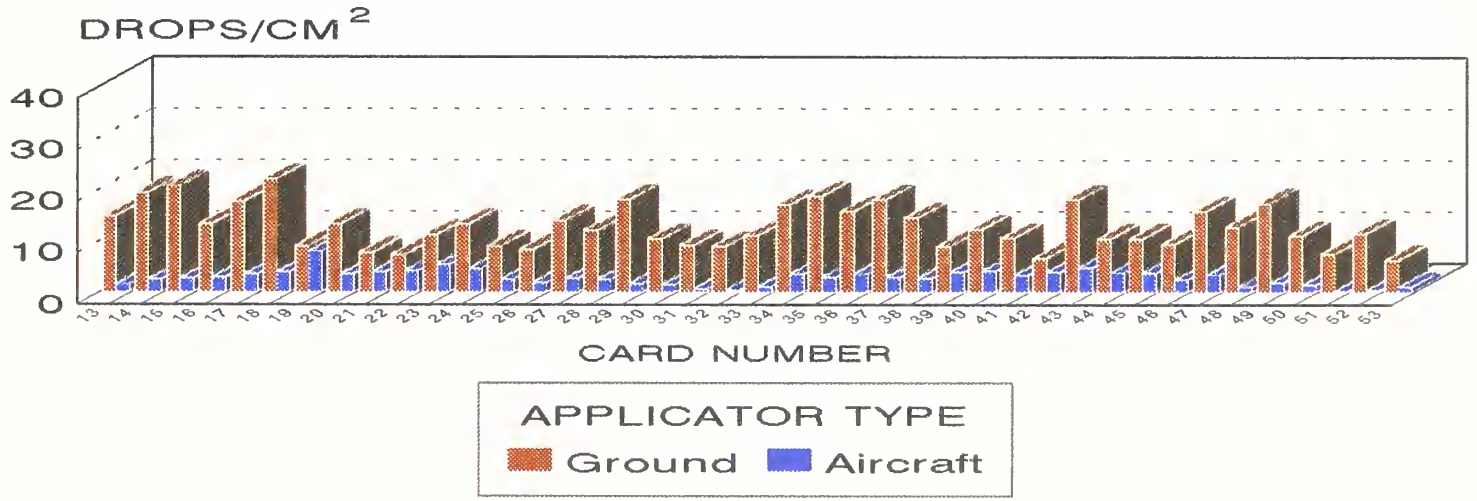
Figure 24

CLAXTON SPRAY TRIALS

DAY 1
GROUND LINE 3



DAY 1
GROUND LINE 4



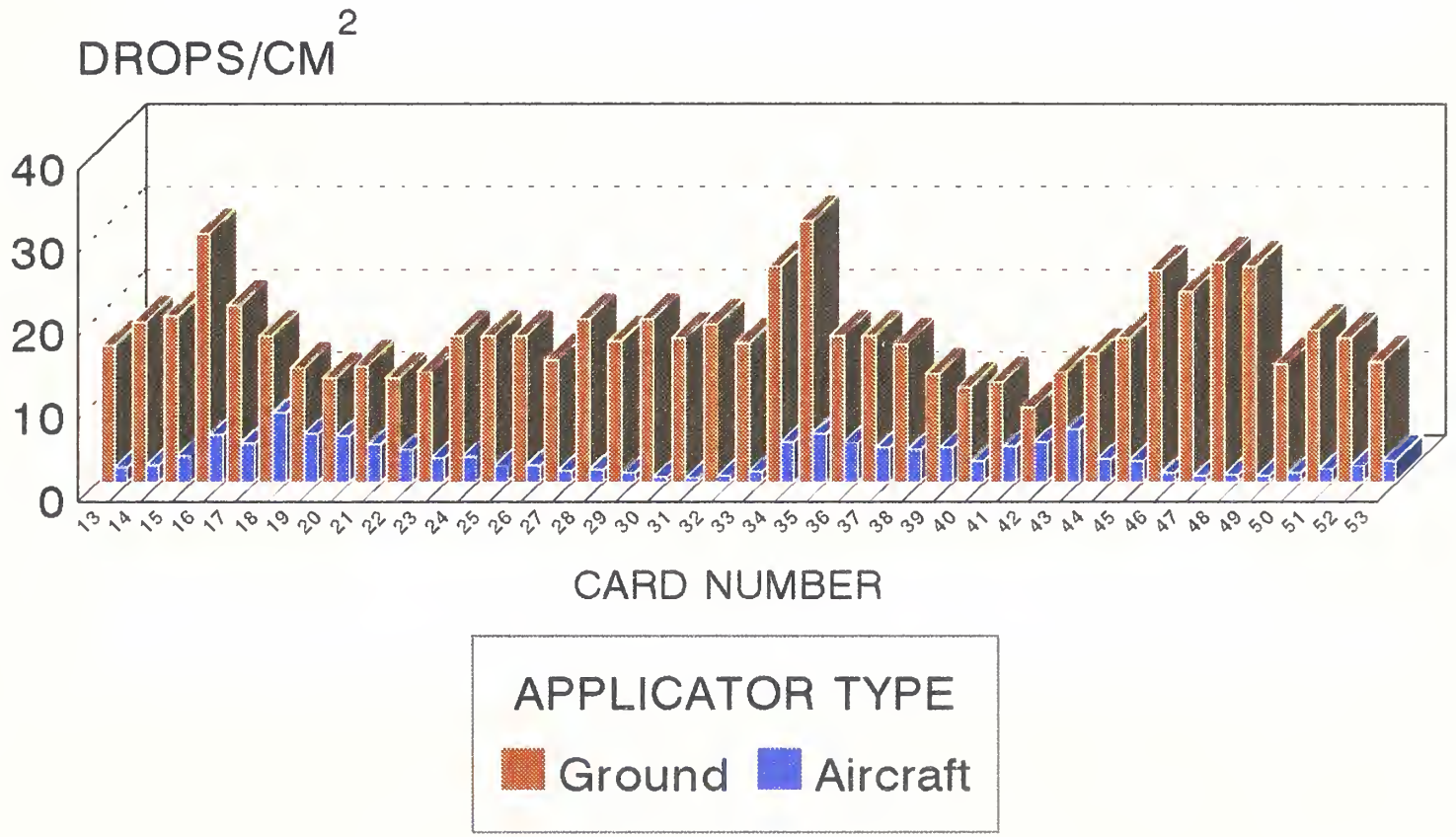
AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 25

CLAXTON SPRAY TRIALS

DAY 1

GROUND LINE 5

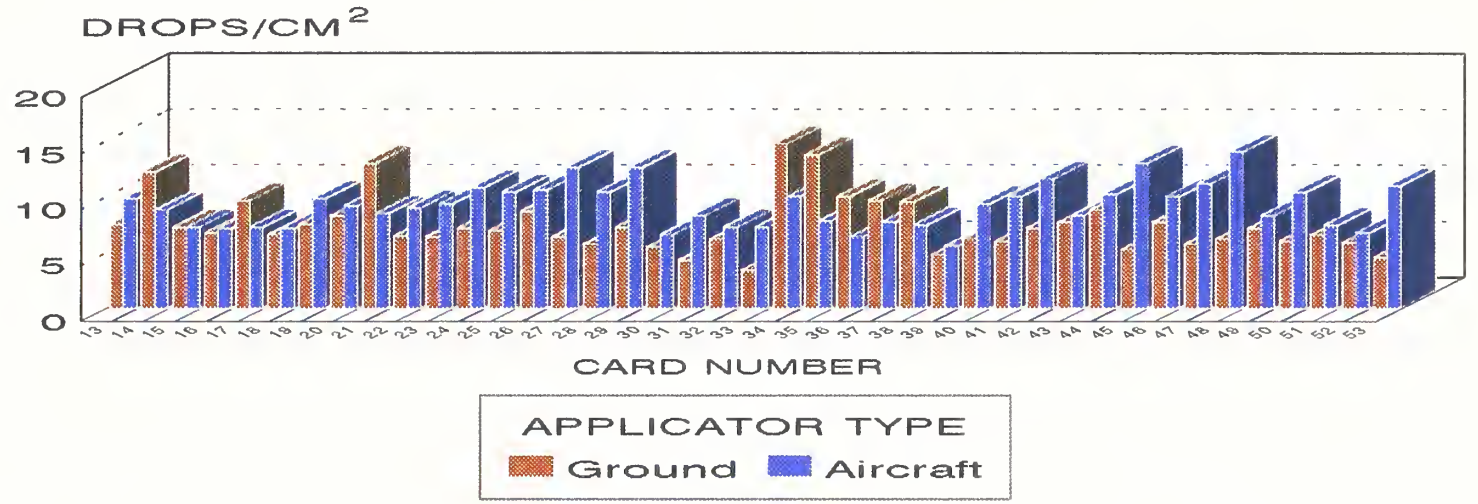


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

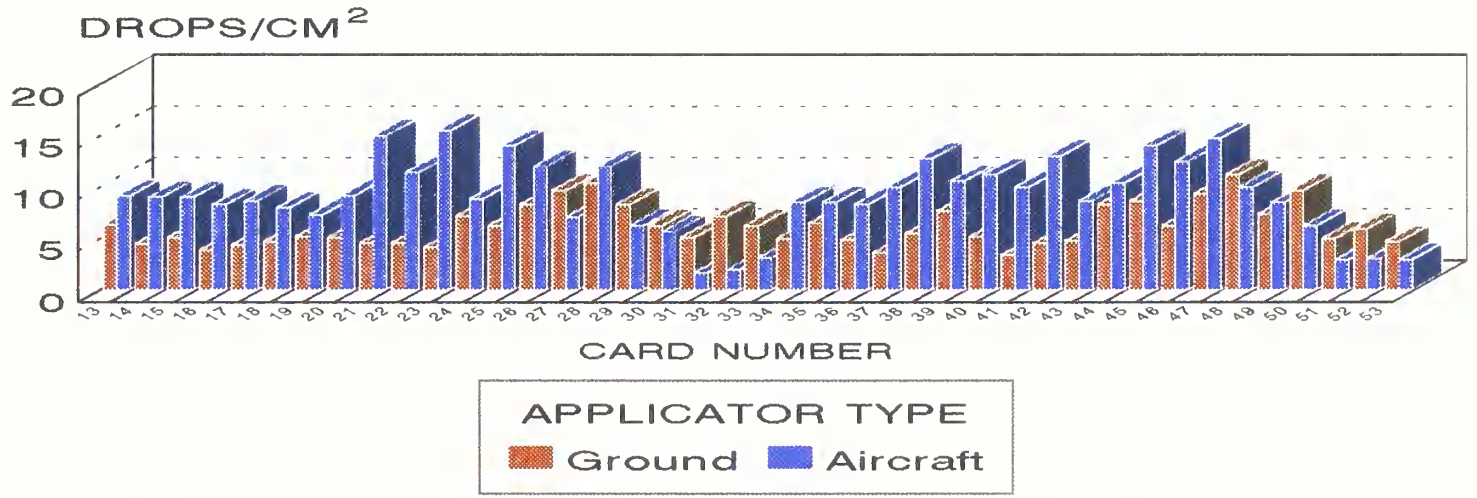
Figure 26

CLAXTON SPRAY TRIALS

DAY 2
GROUND LINE 1



DAY 2
GROUND LINE 2

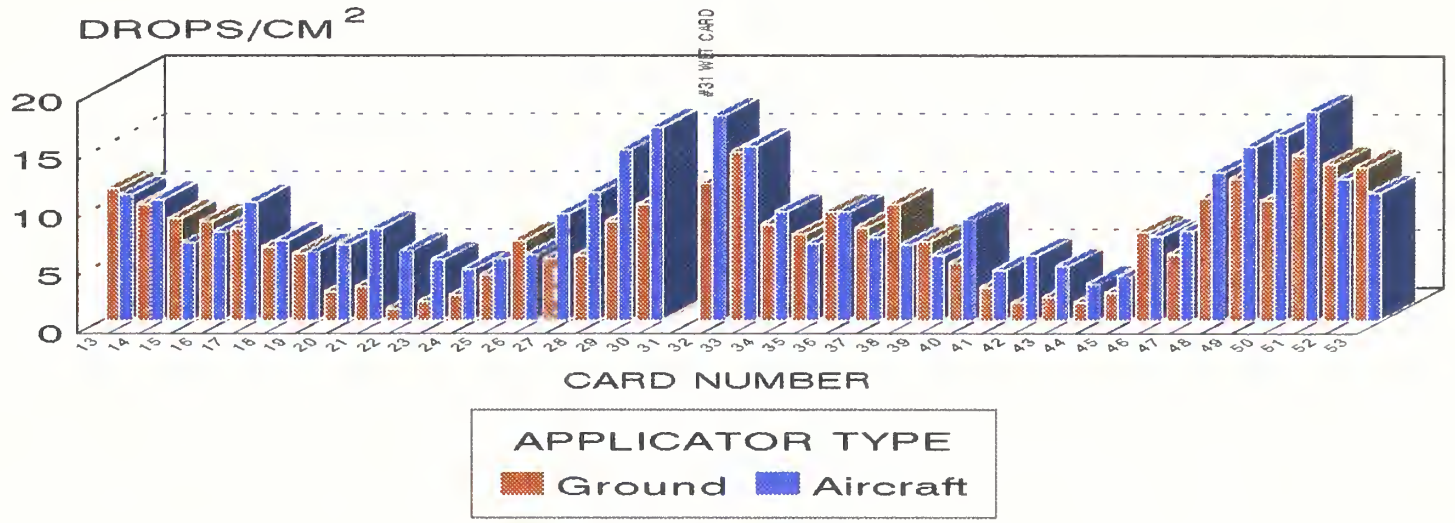


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

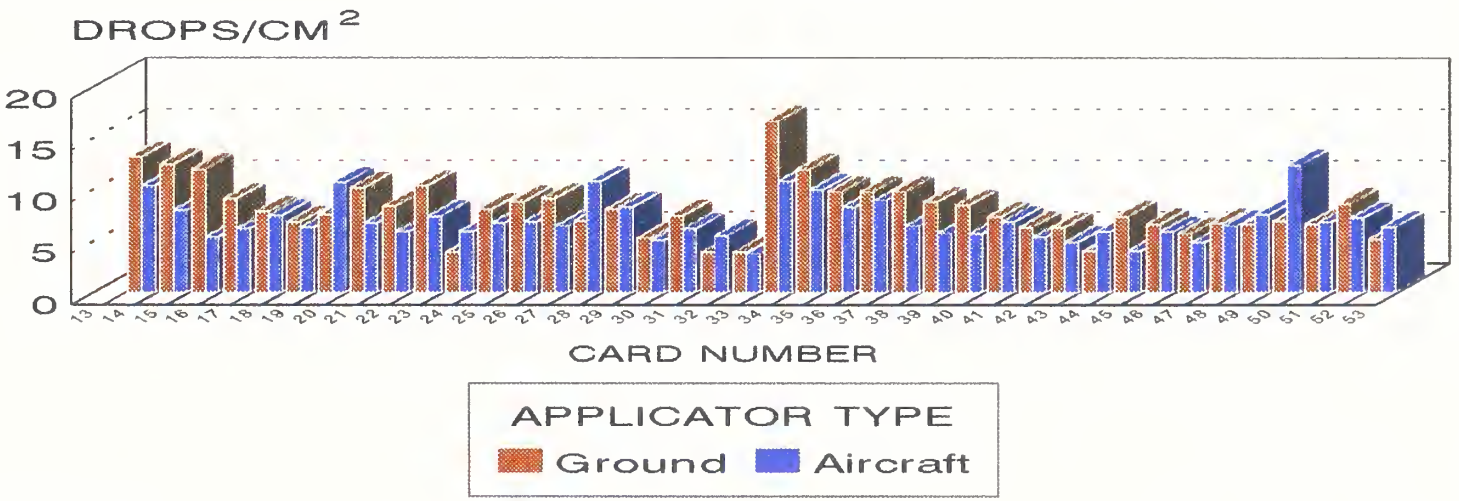
Figure 27

CLAXTON SPRAY TRIALS

DAY 2
GROUND LINE 3



DAY 2
GROUND LINE 4

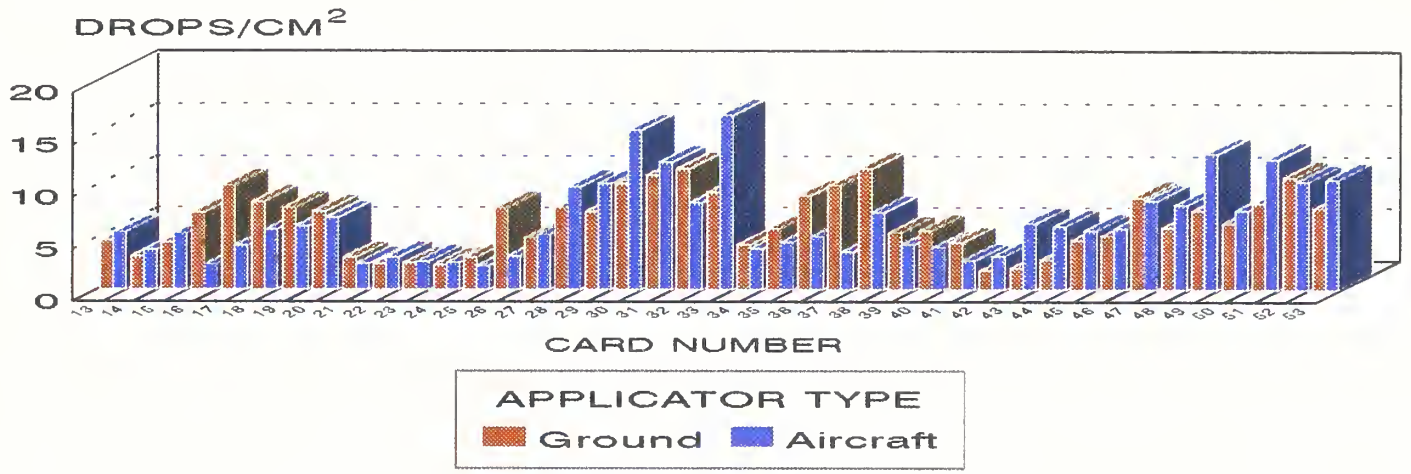


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

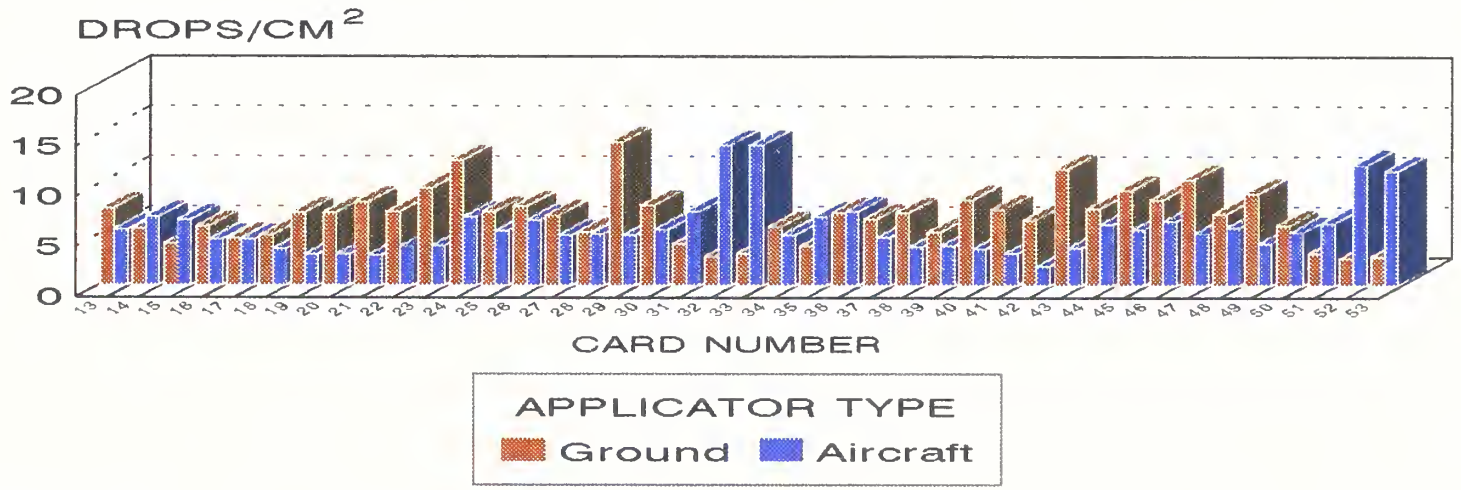
Figure 28

CLAXTON SPRAY TRIALS

DAY 2
GROUND LINE 5



DAY 2
GROUND LINE 6

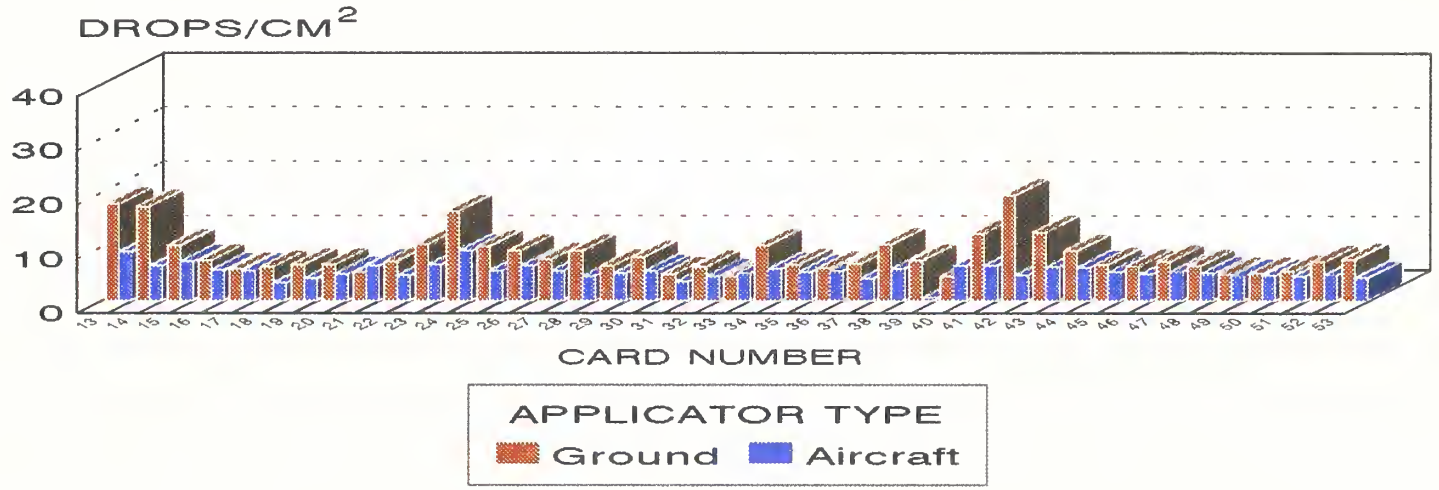


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

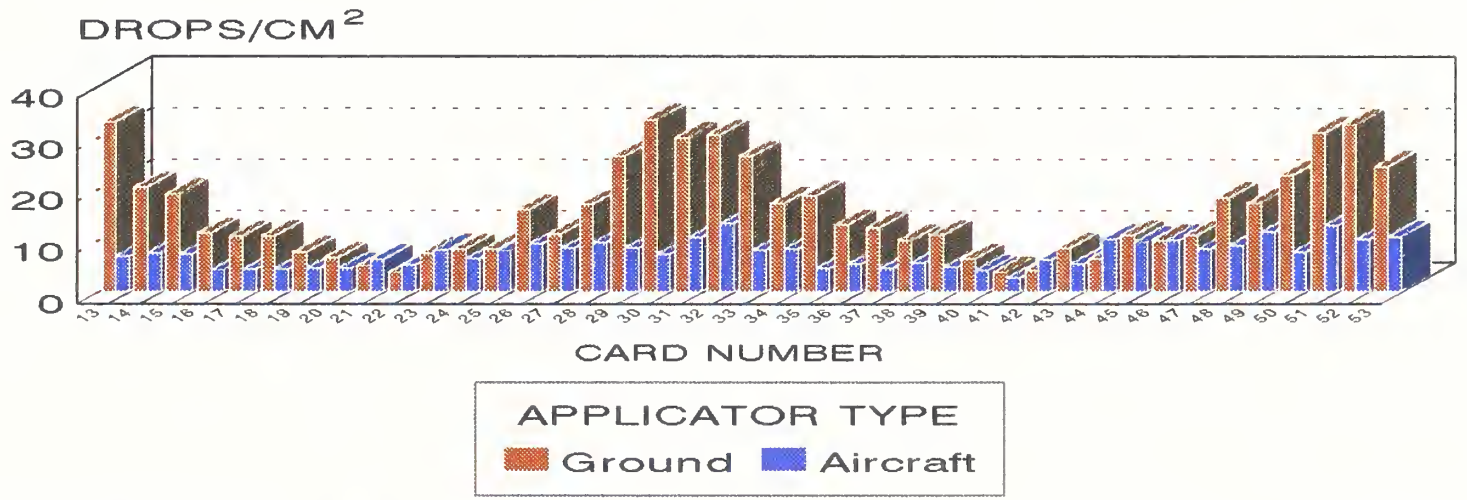
Figure 29

CLAXTON SPRAY TRIALS

DAY 3
GROUND LINE 1



DAY 3
GROUND LINE 2

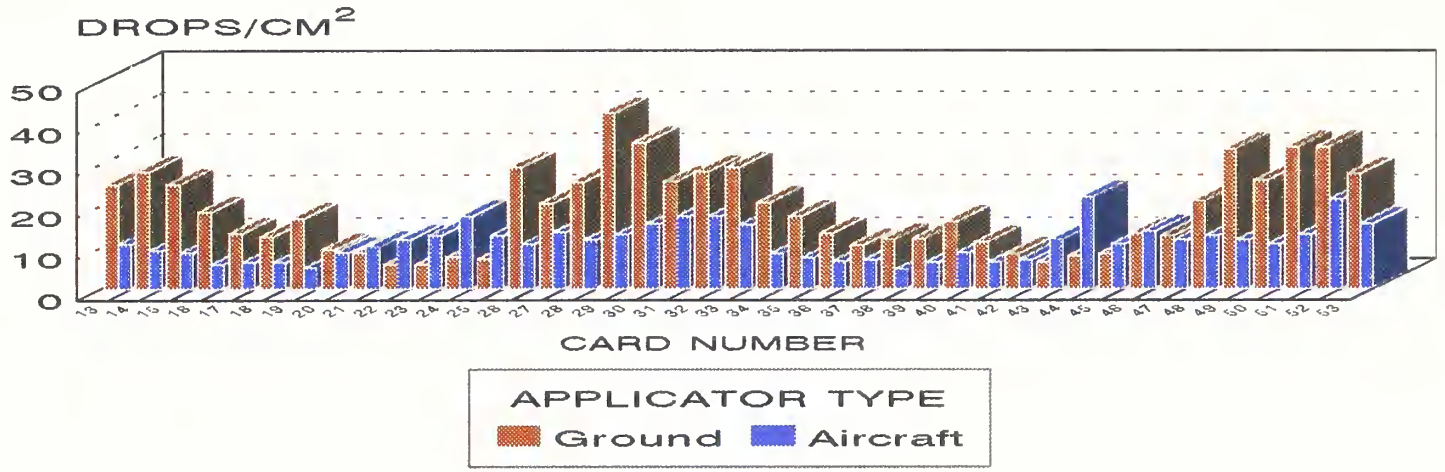


AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

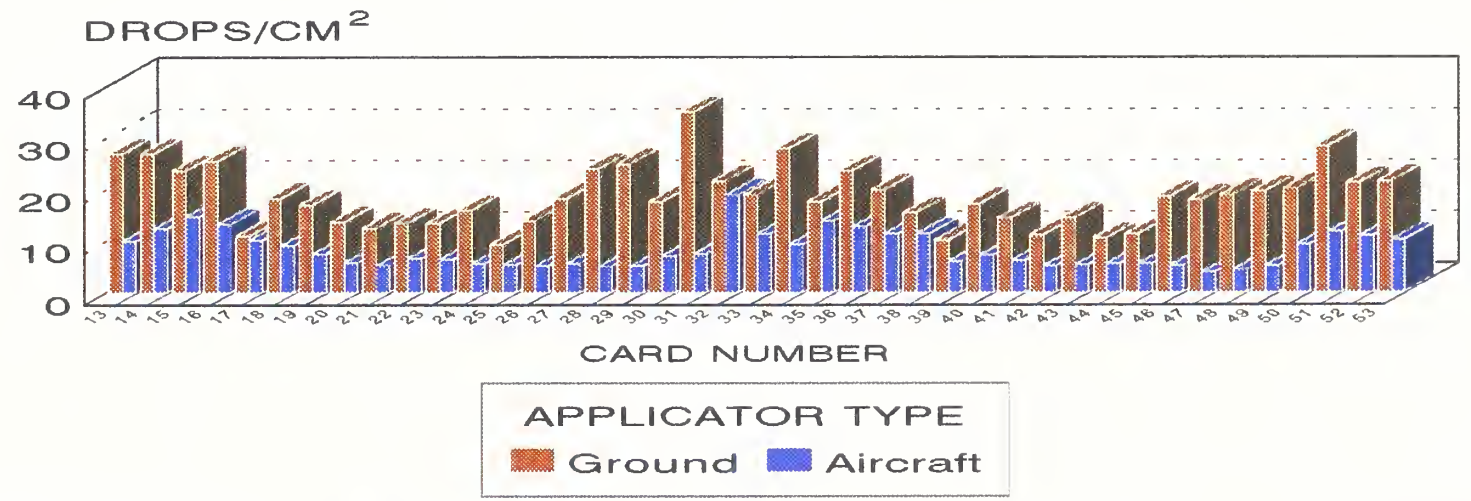
Figure 30

CLAXTON SPRAY TRIALS

DAY 3
GROUND LINE 3



DAY 3
GROUND LINE 4

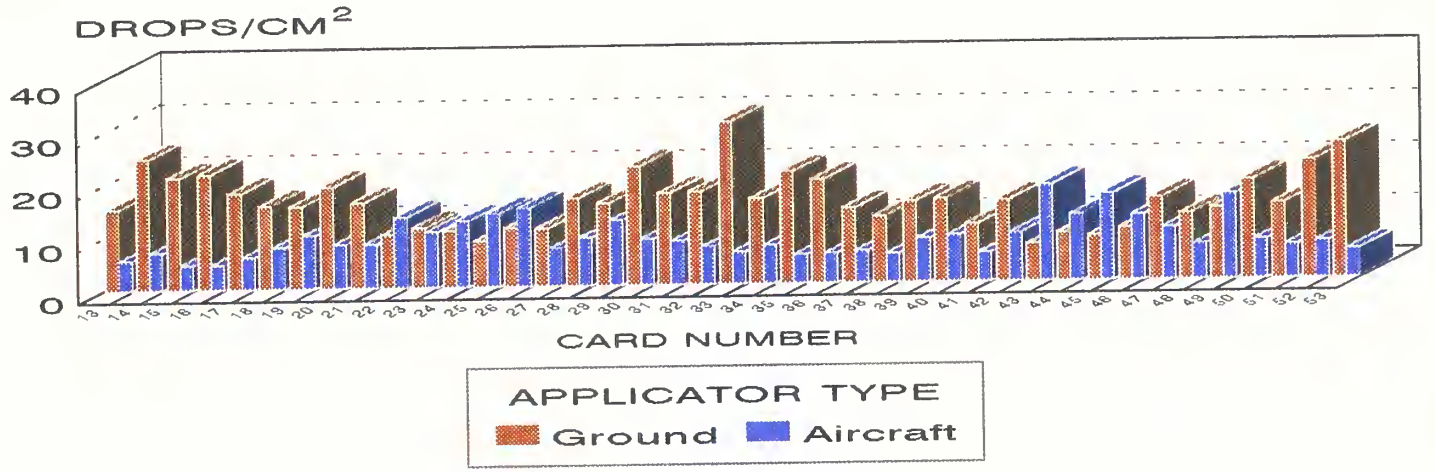


AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

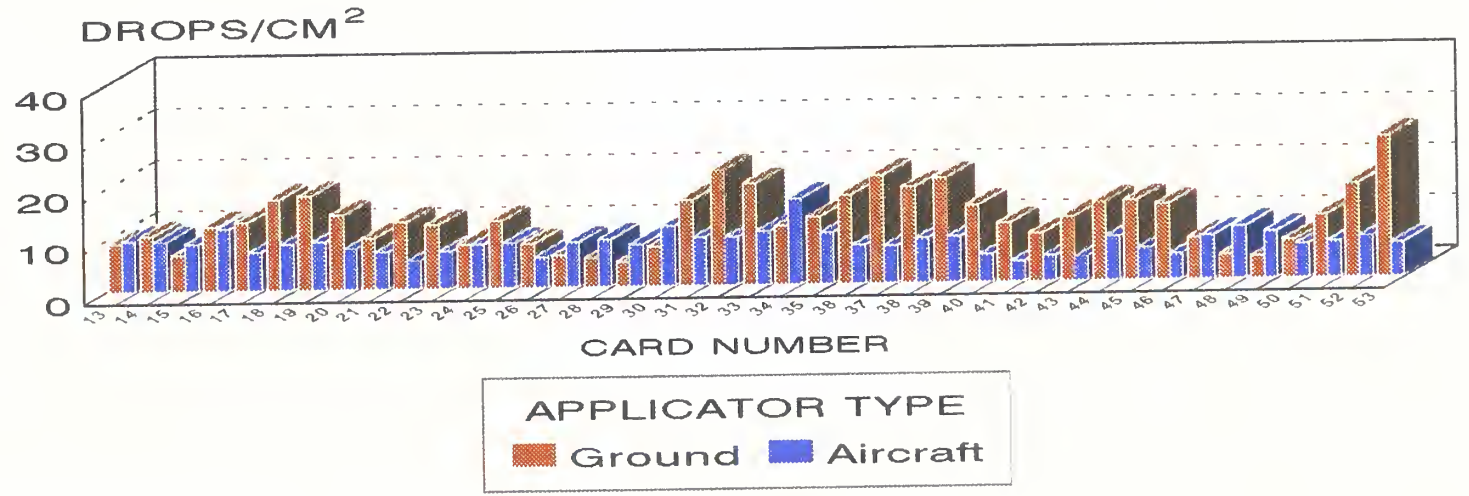
Figure 31

CLAXTON SPRAY TRIALS

DAY 3
GROUND LINE 5



DAY 3
GROUND LINE 6

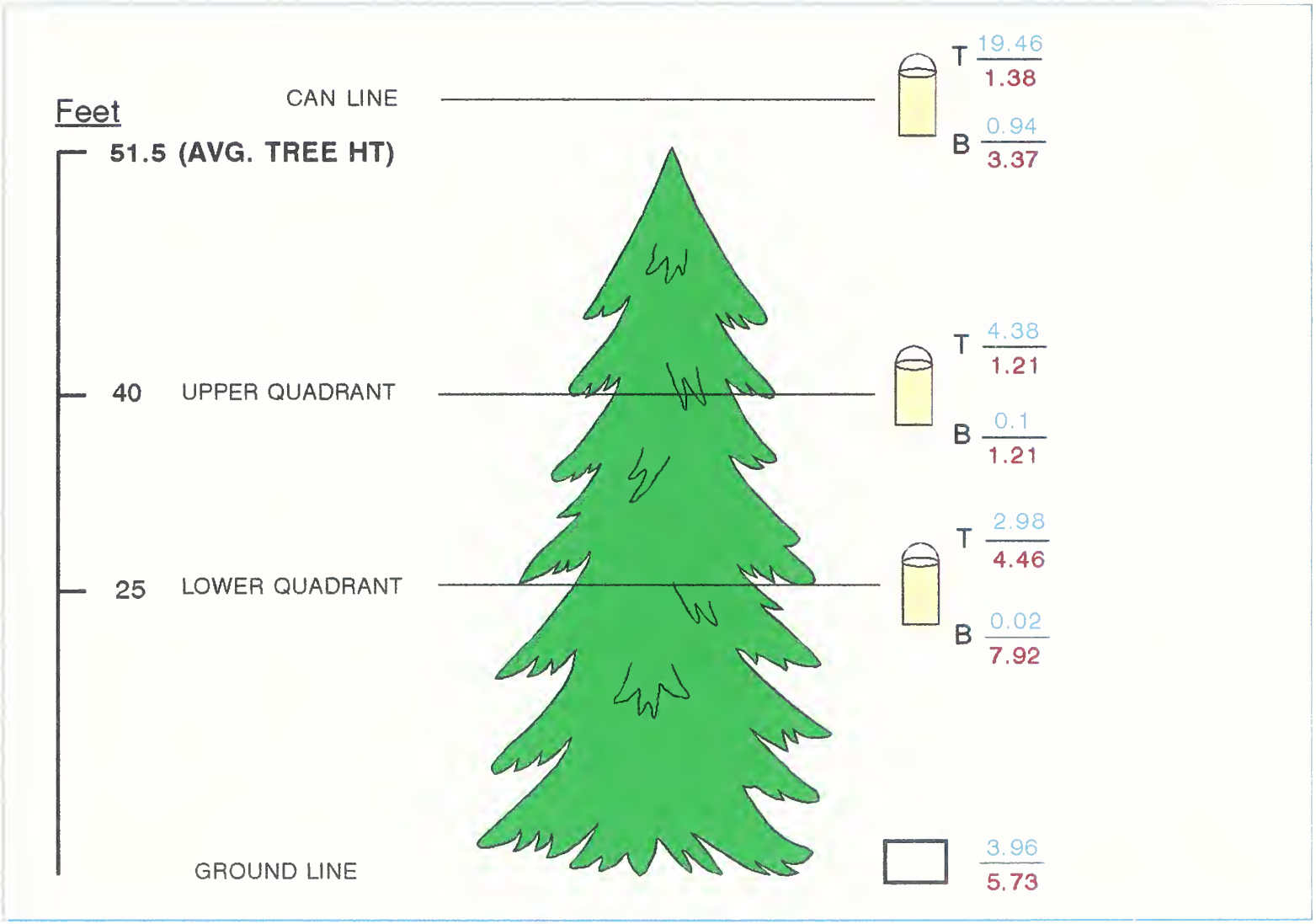


AUGUST 22, 1991
GROUND SPRAYER RATE = 5.8 gal/acre
AIRCRAFT RATE = 1.2 gal/acre

Figure 32

SPRAY DEPOSIT PENETRATION
DAY 1 - AVERAGE DEPOSITION - DROPS/CM^2
CLAXTON SPRAY TRIALS, AUGUST 1991

Figure 33



COMPOSITE DEPOSITION (AVG.) FOR CARDS IMMEDIATELY UNDER TREE, OVER TREE AND WITHIN THE CROWN FOR ALL TREES EACH DAY.

Bullseye

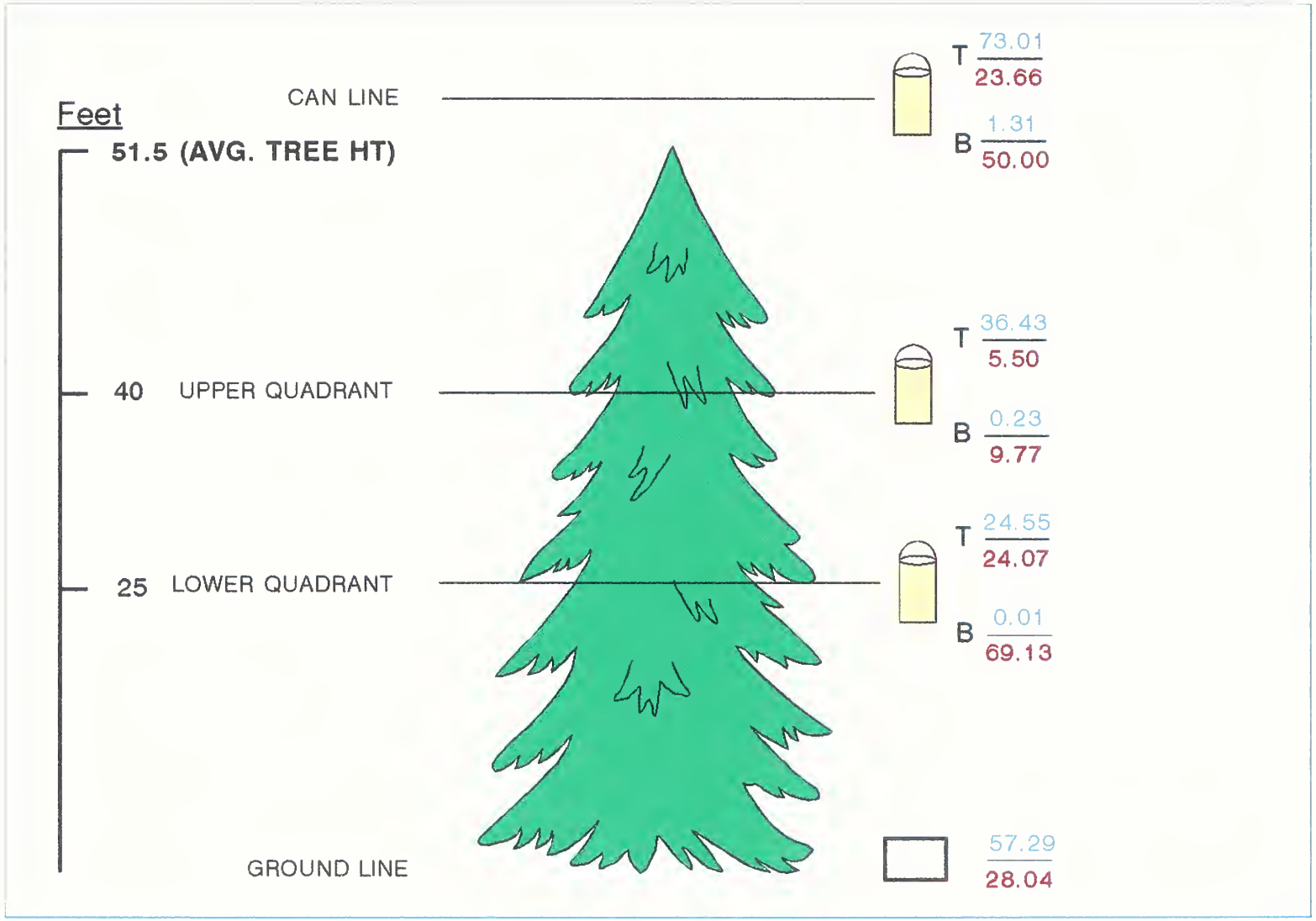
Rhodamine

AIRCRAFT RATE = 1.2 gal/acre

GROUND SPRAYER RATE = 1.2 gal/acre equivalent

Figure 34

SPRAY DEPOSIT PENETRATION
DAY 1 - AVERAGE DEPOSITION - FLUID OUNCES/ACRE
CLAXTON SPRAY TRIALS, AUGUST 1991



COMPOSITE DEPOSITION (AVG.) FOR CARDS IMMEDIATELY UNDER TREE, OVER TREE AND WITHIN THE CROWN FOR ALL TREES EACH DAY.

Bullseye

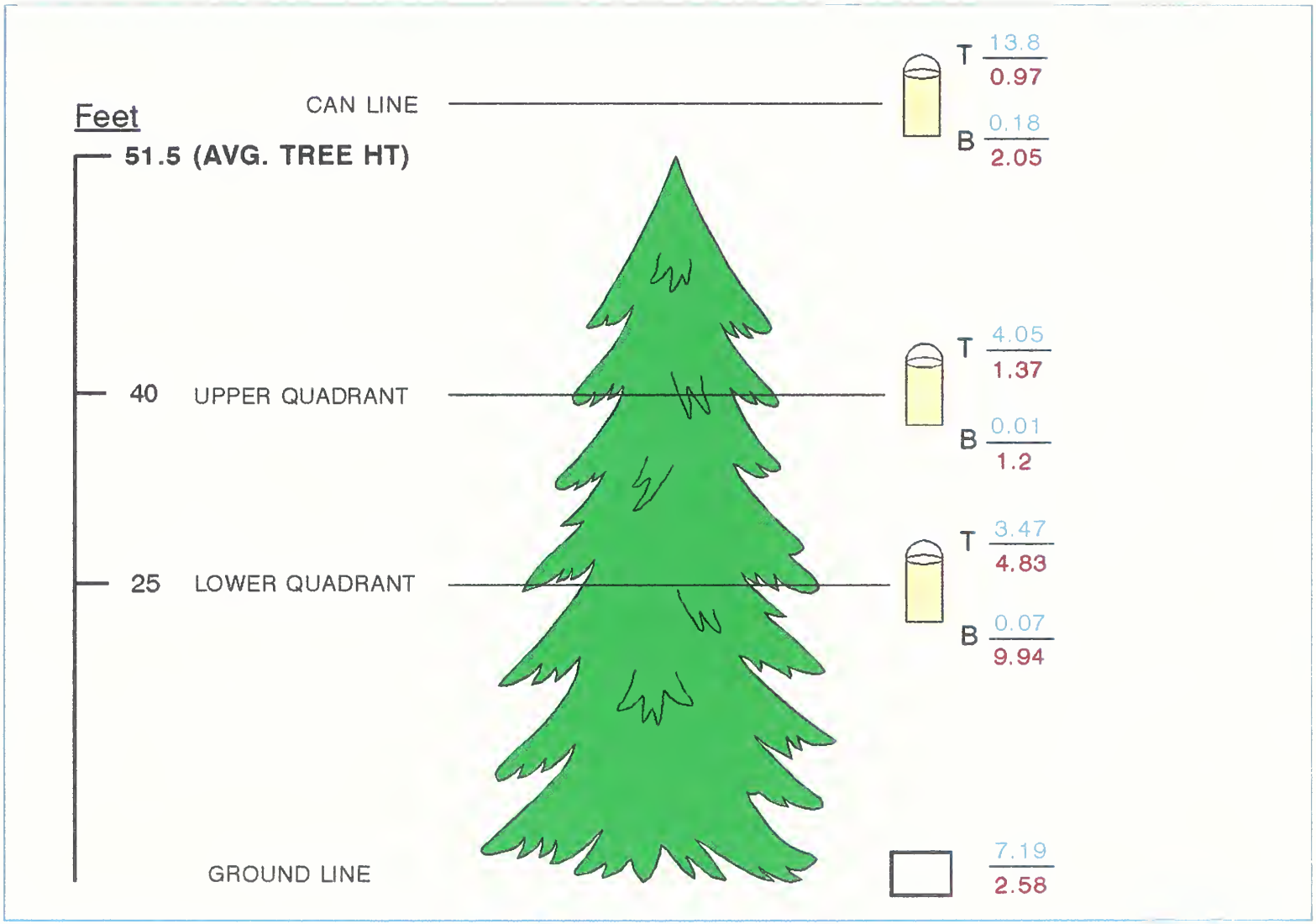
Rhodamine

AIRCRAFT RATE = 1.2 gal/acre

GROUND SPRAYER RATE = 1.2 gal/acre equivalent

Figure 35

SPRAY DEPOSIT PENETRATION
DAY 2 - AVERAGE DEPOSITION - DROPS/CM^2
CLAXTON SPRAY TRIALS, AUGUST 1991



COMPOSITE DEPOSITION (AVG.) FOR CARDS IMMEDIATELY UNDER TREE, OVER TREE AND WITHIN THE CROWN FOR ALL TREES EACH DAY.

Bullseye

Rhodamine

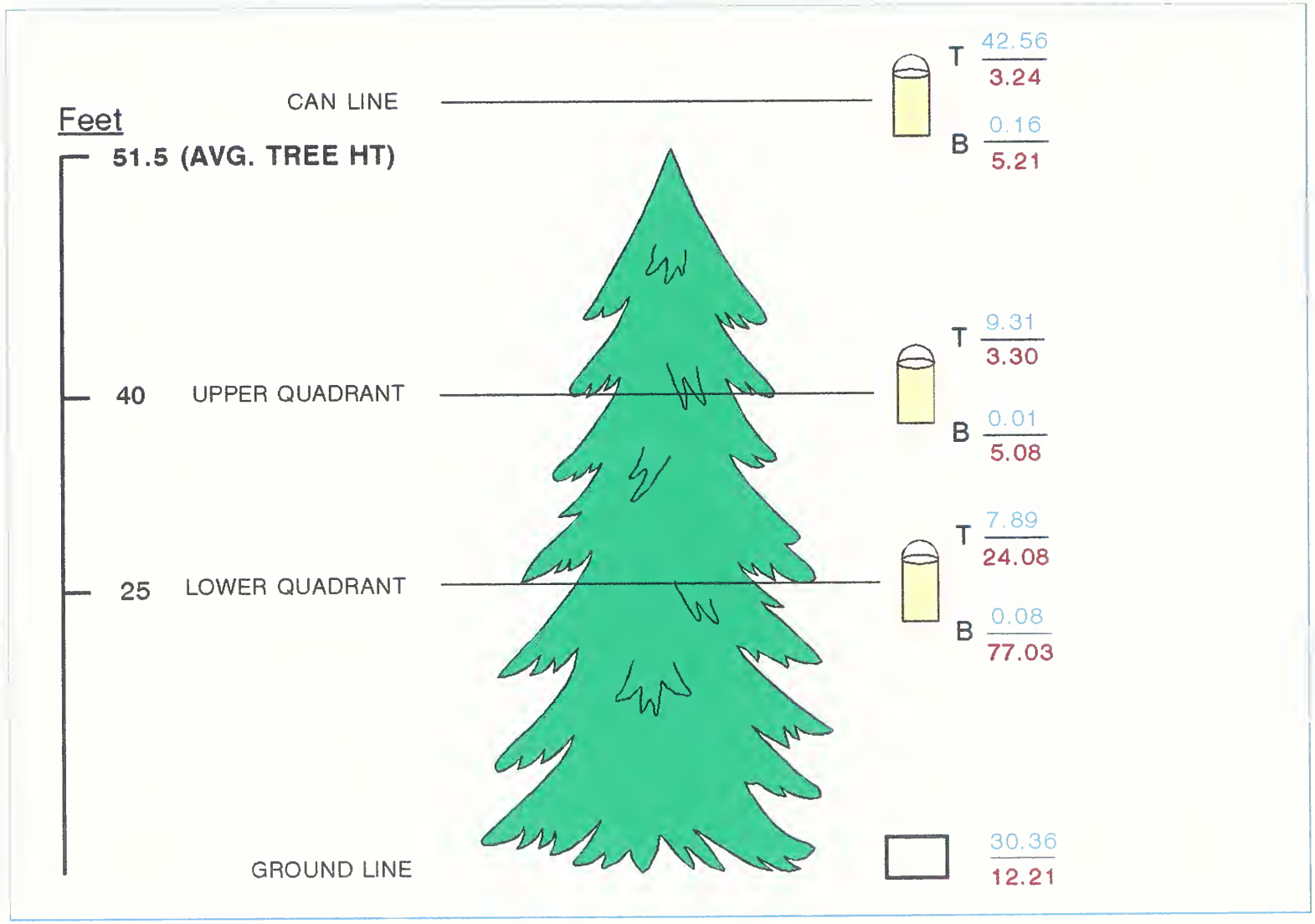
AIRCRAFT RATE = 1.2 gal/acre

GROUND SPRAYER RATE = 1.2 gal/acre equivalent

SPRAY DEPOSIT PENETRATION

Figure 36

DAY 2 - AVERAGE DEPOSITION - FLUID OUNCES/ACRE
CLAXTON SPRAY TRIALS, AUGUST 1991



COMPOSITE DEPOSITION (AVG.) FOR CARDS IMMEDIATELY UNDER TREE, OVER TREE AND WITHIN THE CROWN FOR ALL TREES EACH DAY.

Bullseye

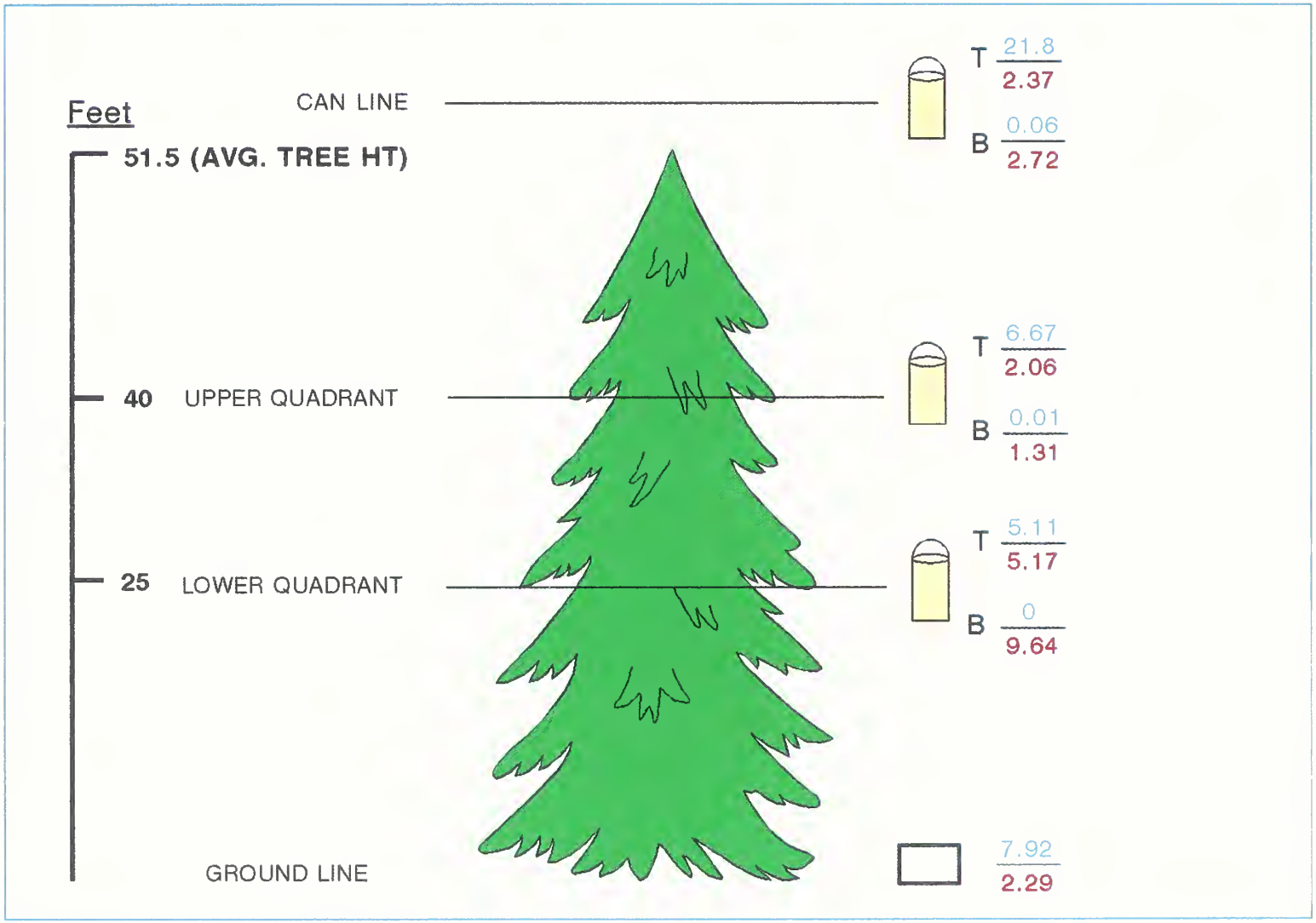
Rhodamine

AIRCRAFT RATE = 1.2 gal/acre

GROUND SPRAYER RATE = 1.2 gal/acre equivalent

SPRAY DEPOSIT PENETRATION
DAY 3 - AVERAGE DEPOSITION - DROPS/CM^2
CLAXTON SPRAY TRIALS, AUGUST 1991

Figure 37



COMPOSITE DEPOSITION (AVG.) FOR CARDS IMMEDIATELY UNDER TREE, OVER TREE AND WITHIN THE CROWN FOR ALL TREES EACH DAY.

Bullseye

Rhodamine

AIRCRAFT RATE = 1.2 gal/acre

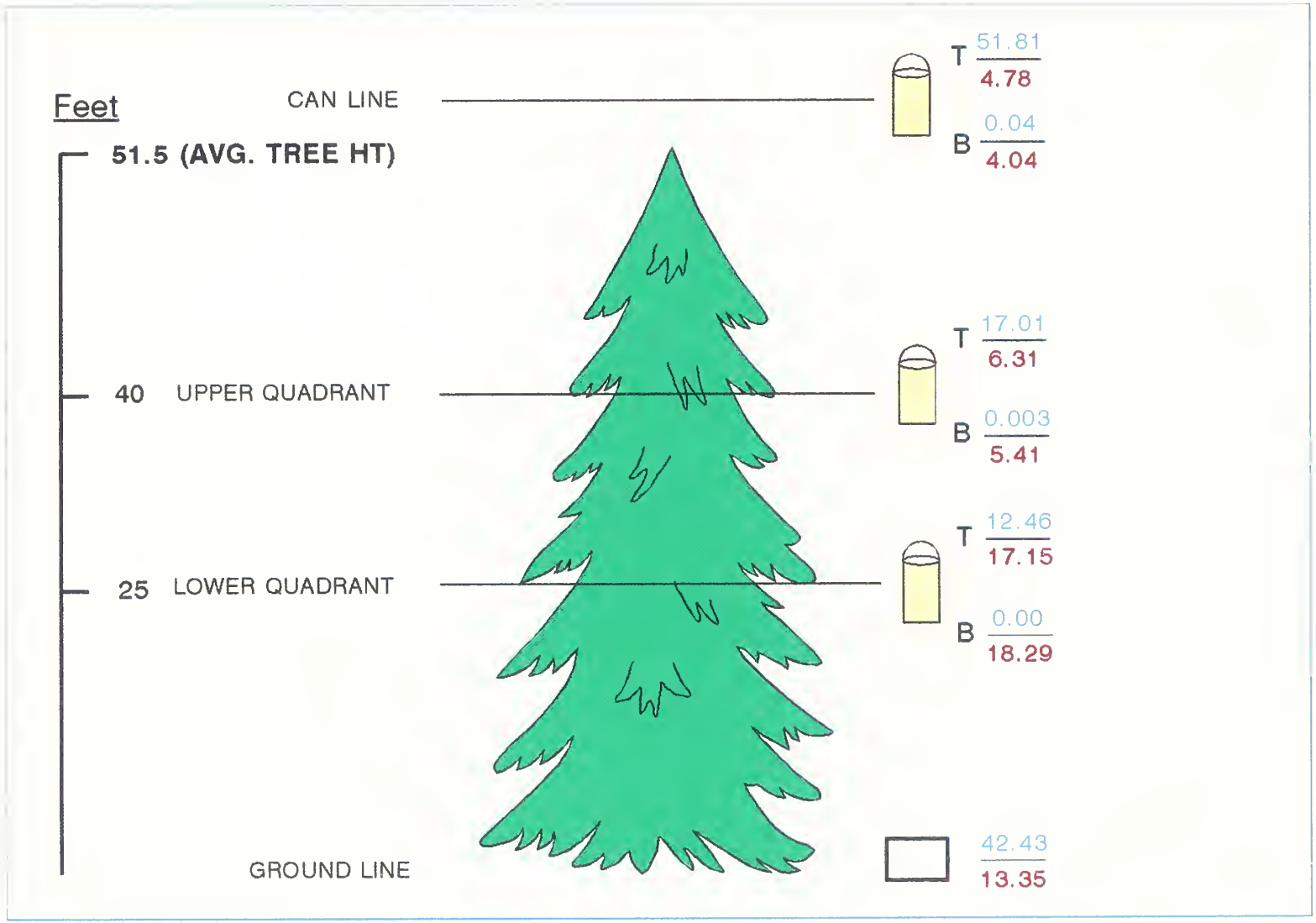
GROUND SPRAYER RATE = 1.2 gal/acre equivalent

SPRAY DEPOSIT PENETRATION

Figure 38

DAY 3 - AVERAGE DEPOSITION - FLUID OUNCES/ACRE

CLAXTON SPRAY TRIALS, AUGUST 1991



COMPOSITE DEPOSITION (AVG.) FOR CARDS IMMEDIATELY UNDER TREE, OVER TREE AND WITHIN THE CROWN FOR ALL TREES EACH DAY.

Bullseye

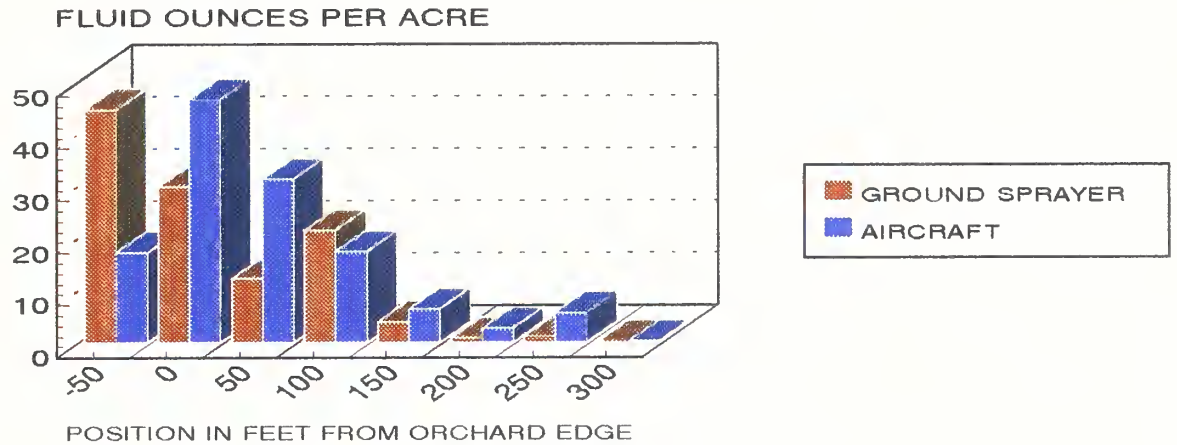
Rhodamine

AIRCRAFT RATE = 1.2 gal/acre

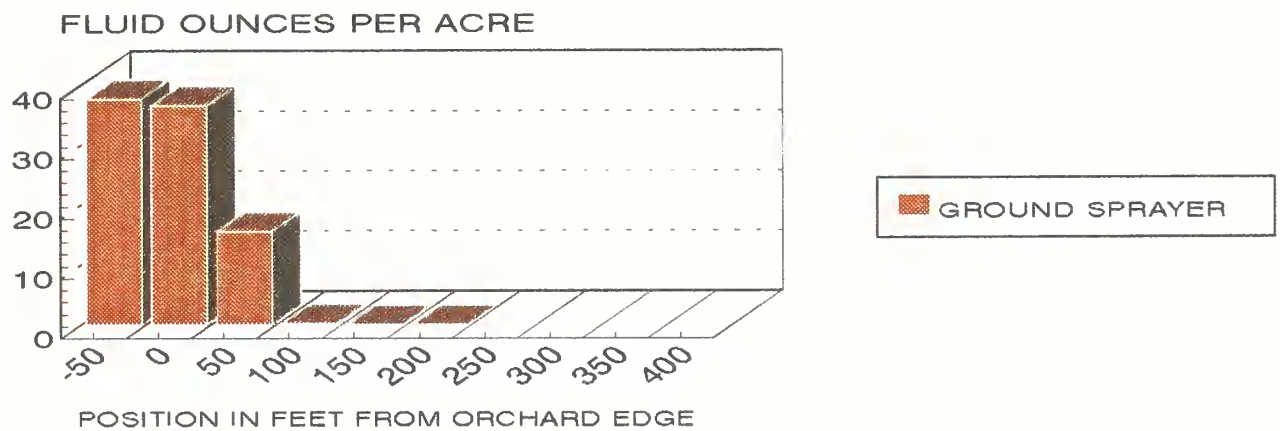
GROUND SPRAYER RATE = 1.2 gal/acre equivalent

CLAXTON SPRAY TRIALS

DAY 1
DRIFT LINE 1



DAY 1
DRIFT LINE 2

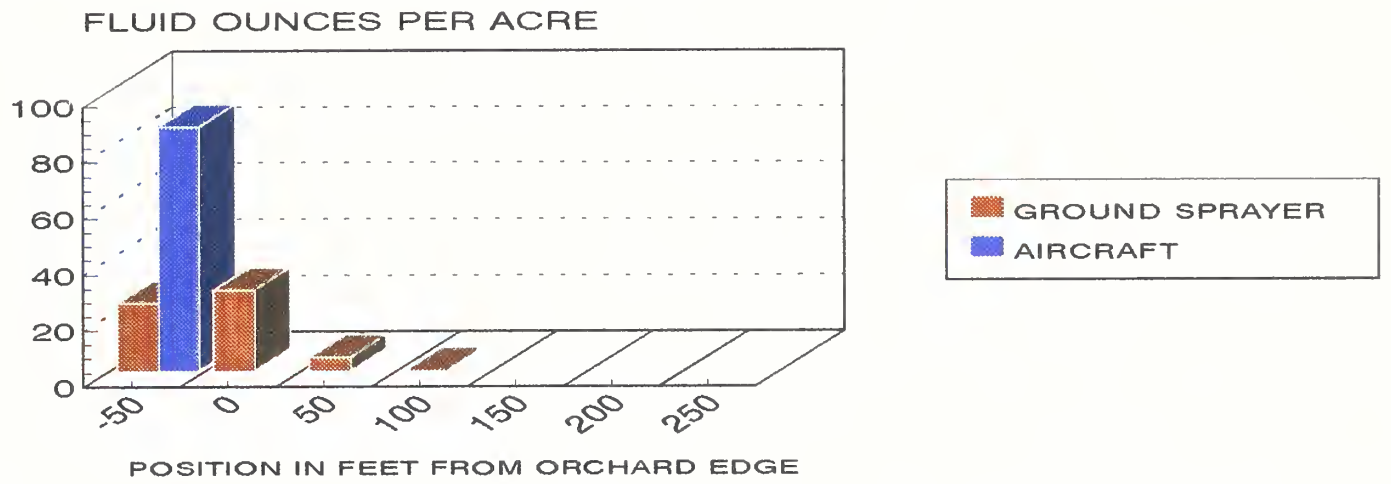


APPLICATION FOR BOTH GROUND AND AIRCRAFT WAS EQUIVALENT TO 1.2 gal/acre
AUGUST 20, 1991
NO BULLSEYE DEPOSITION DETECTED ON CARDS

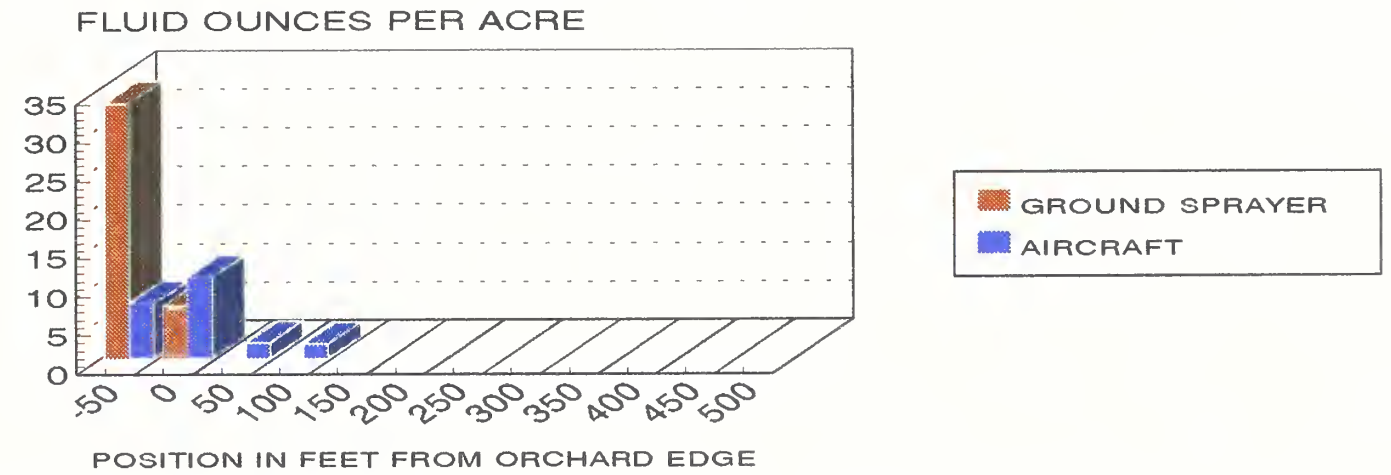
Figure 39

CLAXTON SPRAY TRIALS

DAY 1
DRIFT LINE 3



DAY 1
DRIFT LINE 4

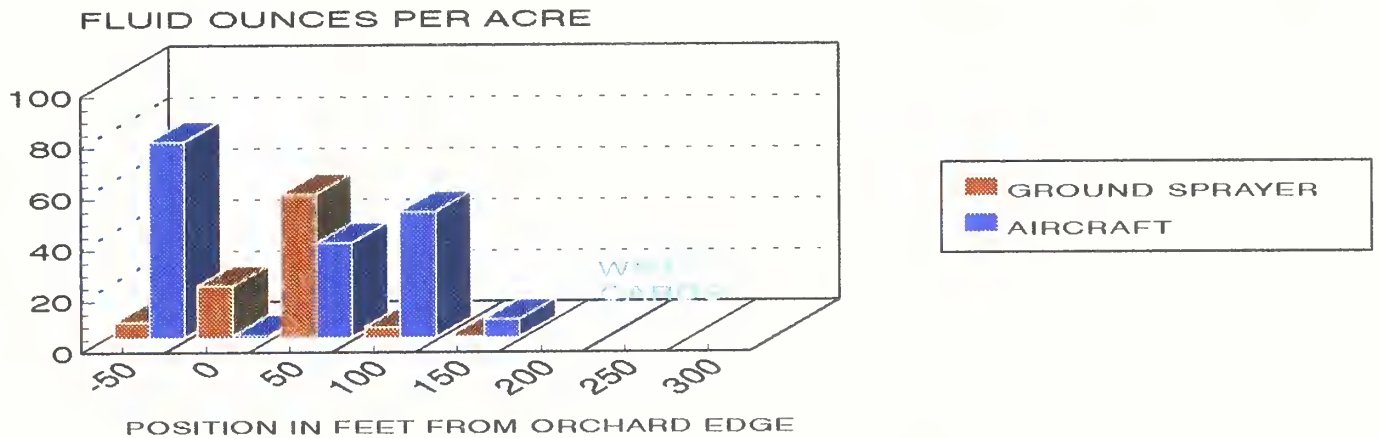


APPLICATION FOR BOTH GROUND AND AIRCRAFT WAS EQUIVALENT TO 1.2 gal/acre
AUGUST 20, 1991

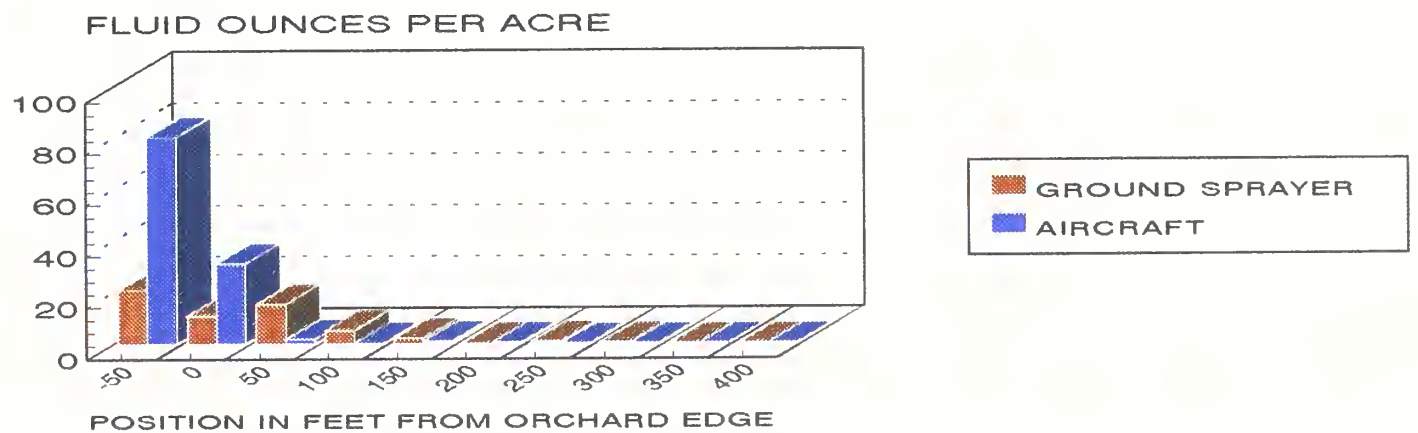
Figure 40

CLAXTON SPRAY TRIALS

DAY 2
DRIFT LINE 1



DAY 2
DRIFT LINE 2

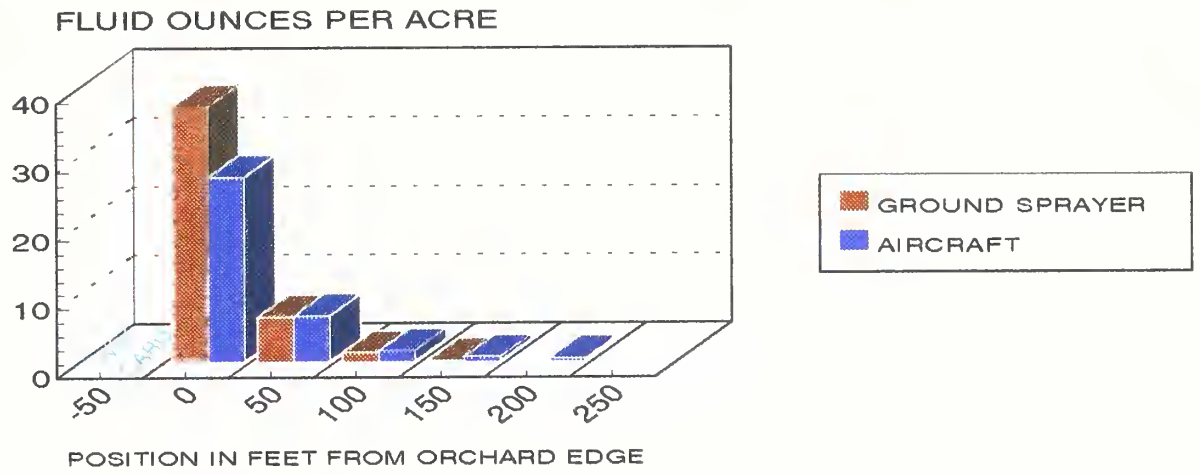


APPLICATION FOR BOTH GROUND AND AIRCRAFT WAS EQUIVALENT TO 1.2 gal/acre
AUGUST 21, 1991

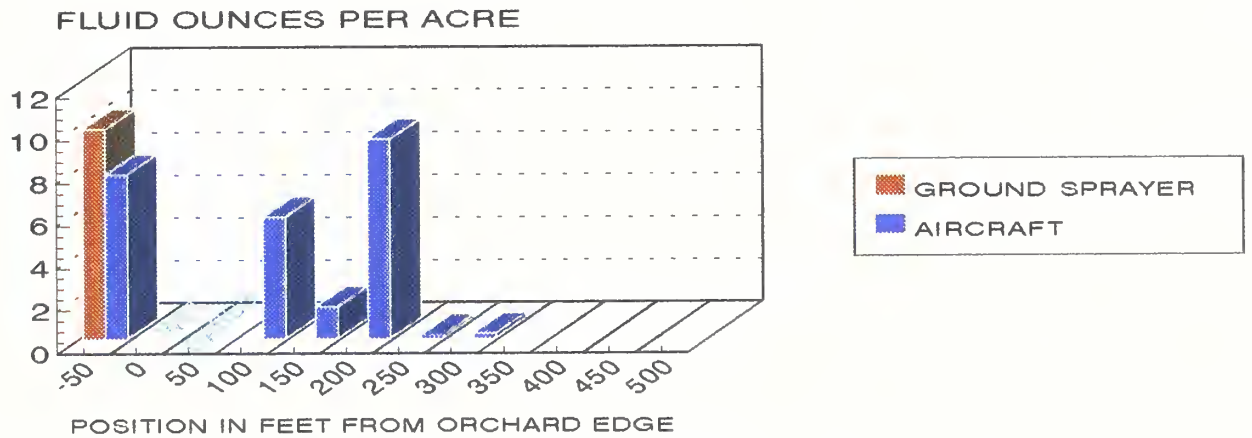
Figure 41

CLAXTON SPRAY TRIALS

DAY 2
DRIFT LINE 3



DAY 2
DRIFT LINE 4

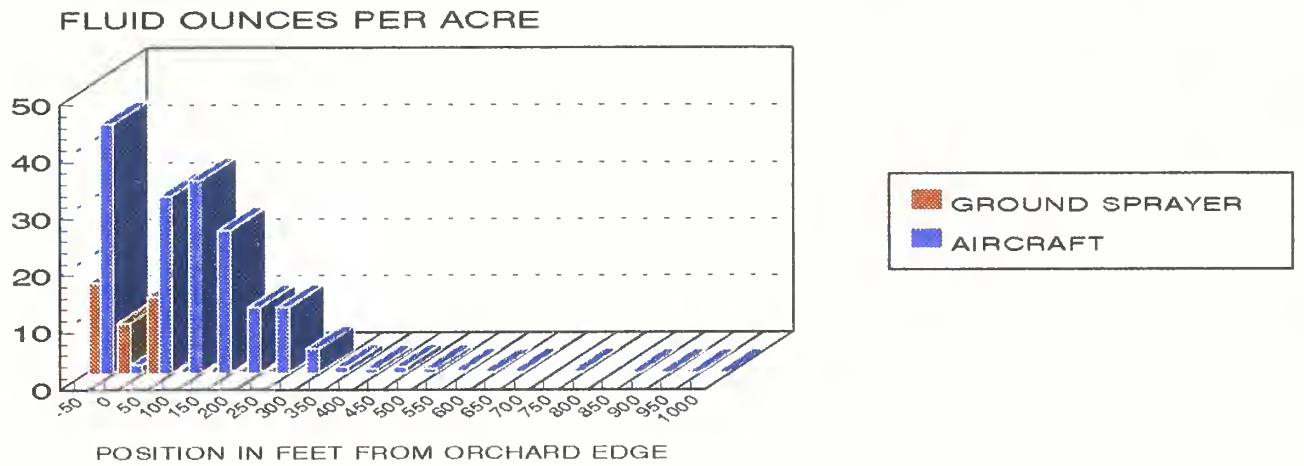


APPLICATION FOR BOTH GROUND AND AIRCRAFT WAS EQUIVALENT TO 1.2 gal/acre
AUGUST 21, 1991

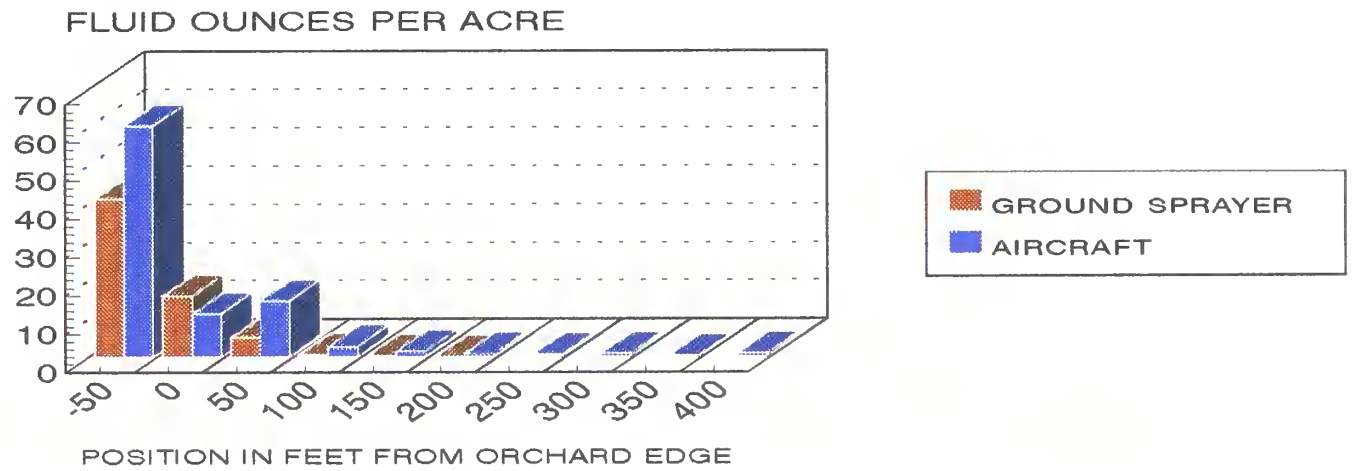
Figure 42

CLAXTON SPRAY TRIALS

DAY 3
DRIFT LINE 1



DAY 3
DRIFT LINE 2

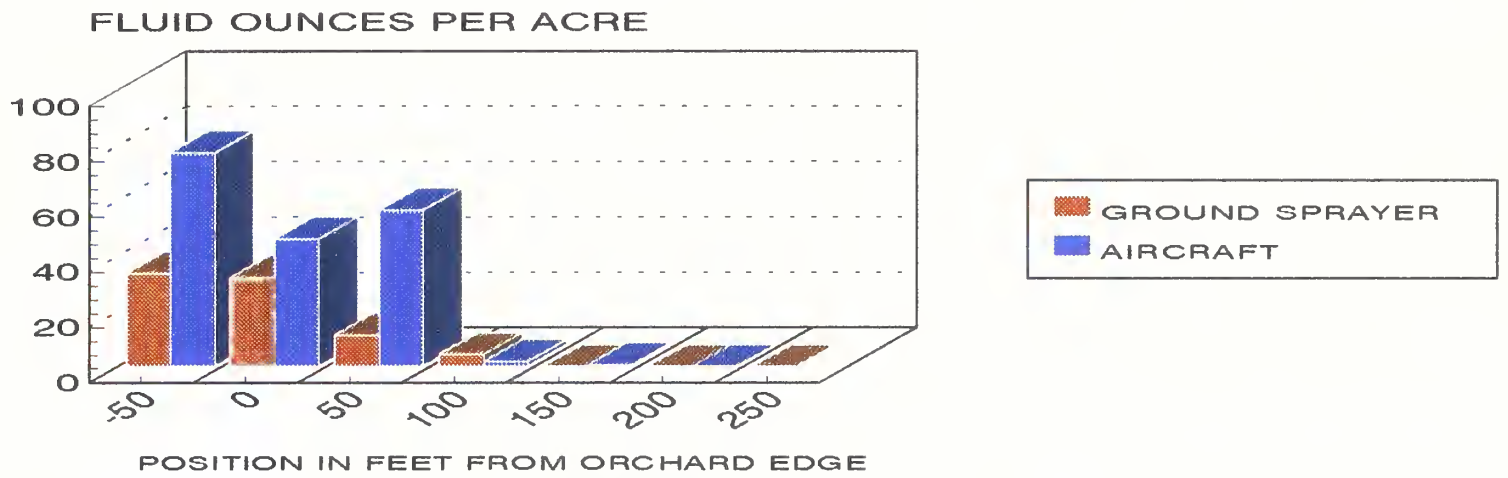


APPLICATION FOR BOTH GROUND AND AIRCRAFT WAS EQUIVALENT TO 1.2 gal/acre
AUGUST 22, 1991

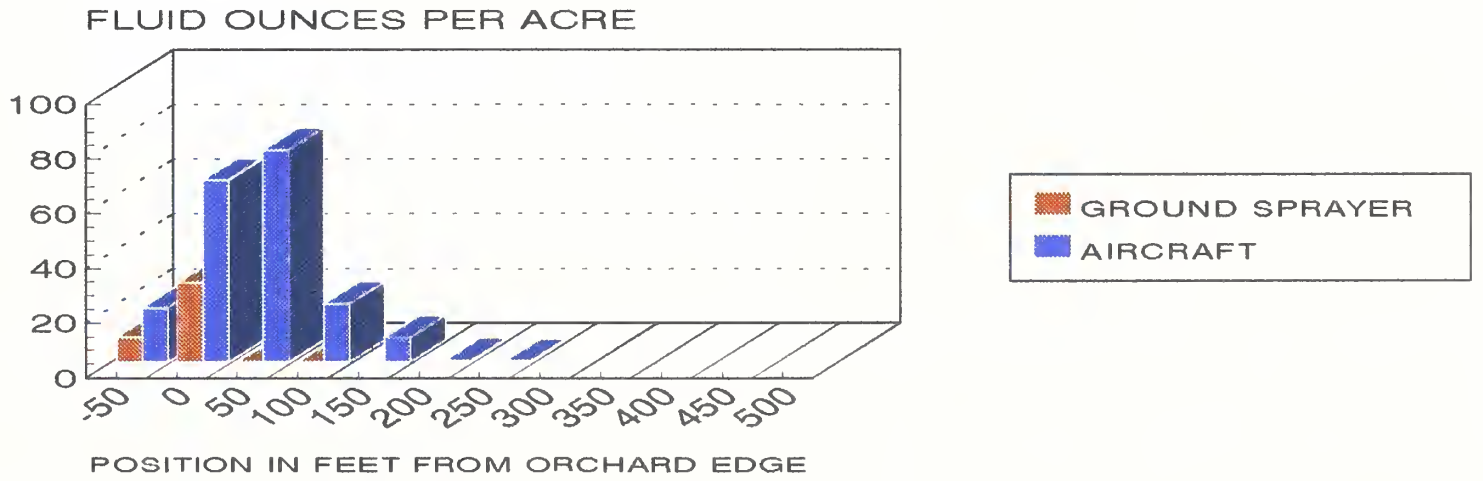
Figure 43

CLAXTON SPRAY TRIALS

DAY 3
DRIFT LINE 3



DAY 3
DRIFT LINE 4

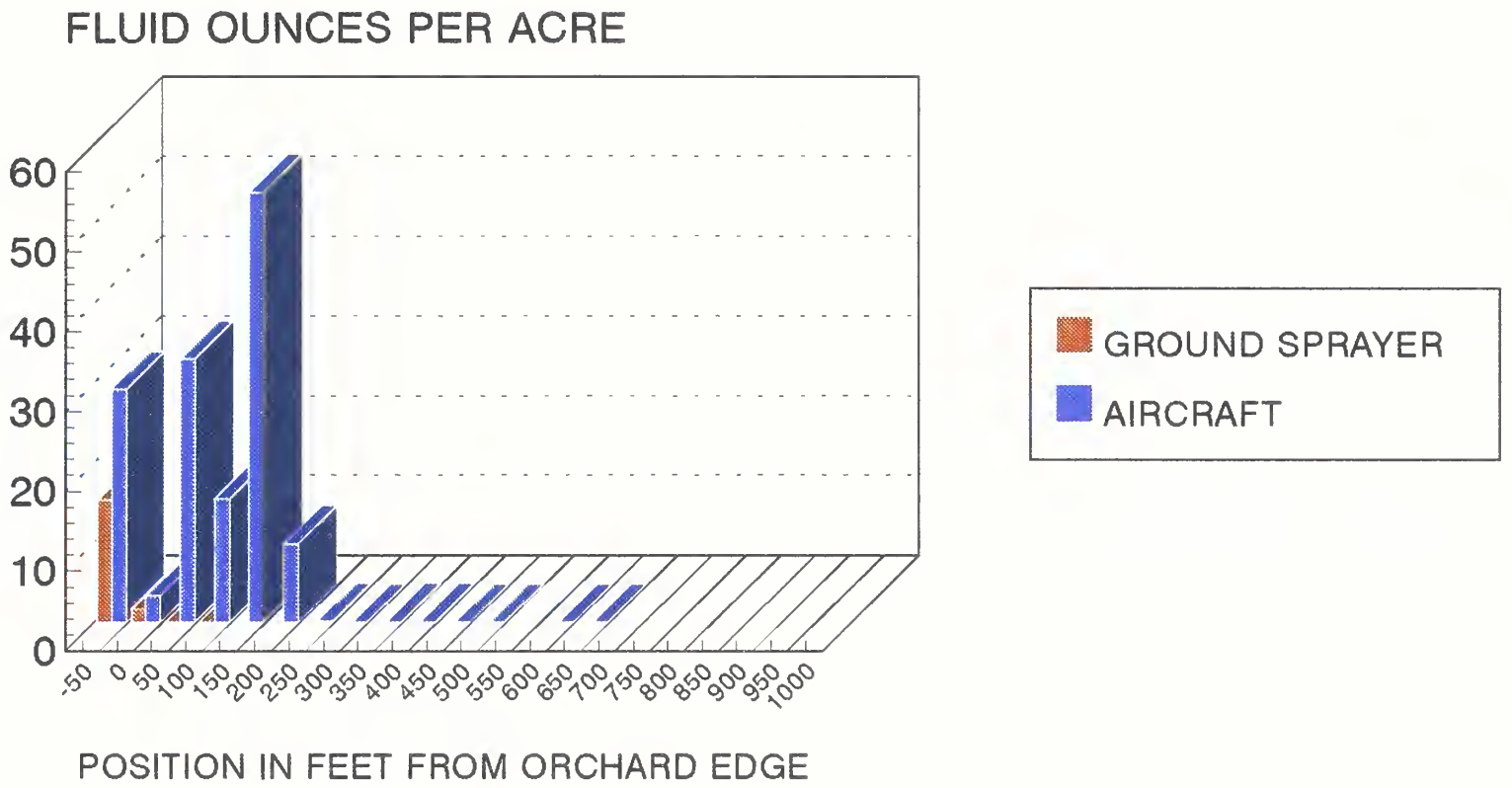


APPLICATION FOR BOTH GROUND AND AIRCRAFT WAS EQUIVALENT TO 1.2 gal/acre
AUGUST 22, 1991

Figure 44

CLAXTON SPRAY TRIALS

DAY 3
DRIFT LINE 0



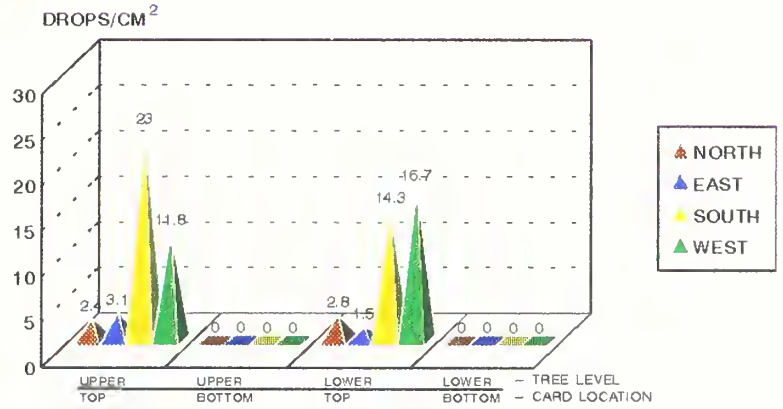
APPLICATION FOR BOTH GROUND AND AIRCRAFT WAS EQUIVALENT TO 1.2 gal/acre
AUGUST 22, 1991

Figure 45

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

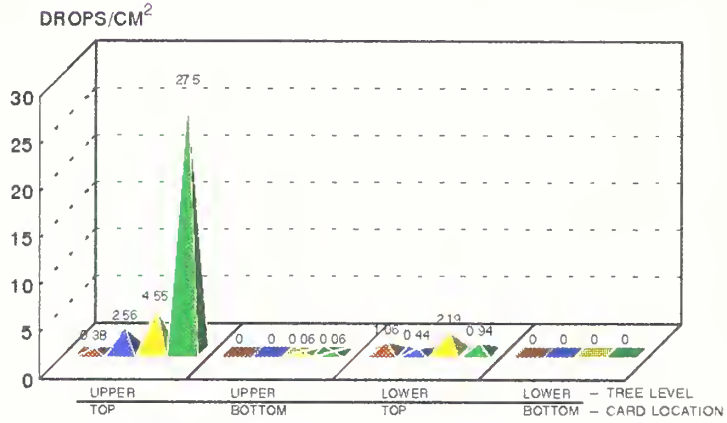
Figure 46

AIRCRAFT - DAY 1
TREE LINE 1 - TREE 1



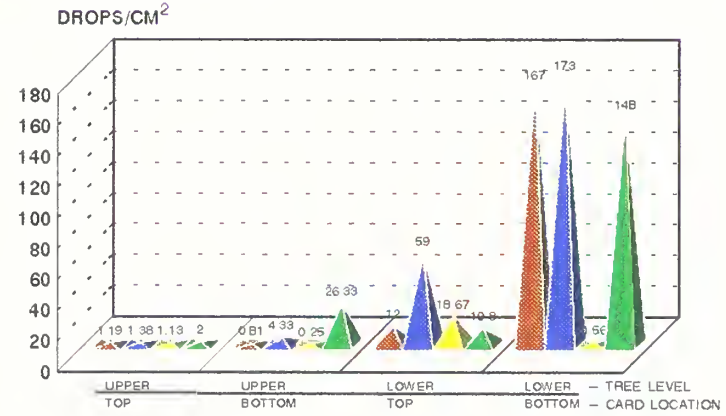
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 1
TREE LINE 1 - TREE 2



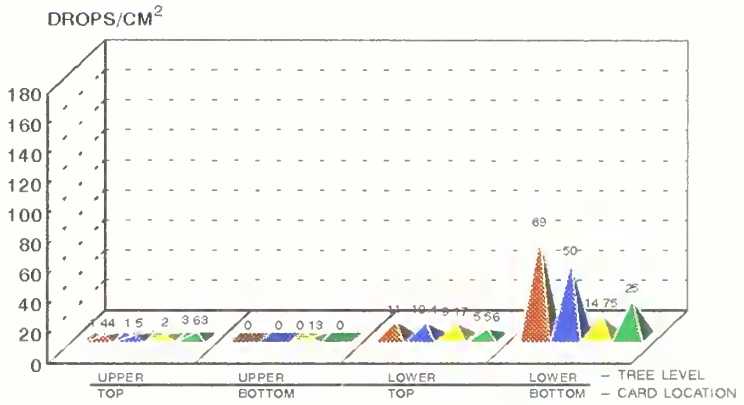
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 1
TREE LINE 1 - TREE 1



AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 1
TREE LINE 1 - TREE 2

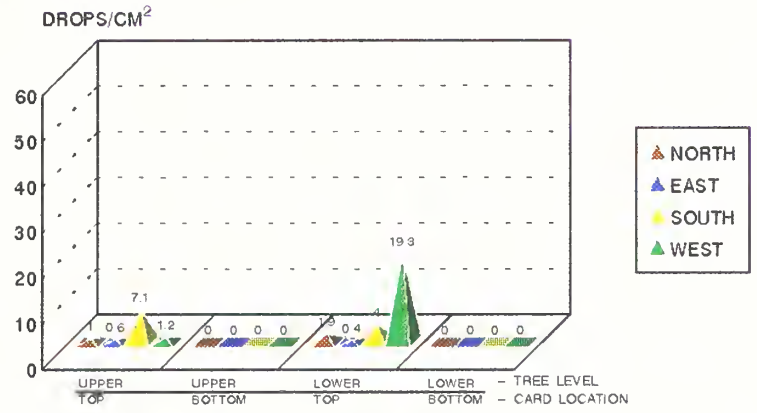


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

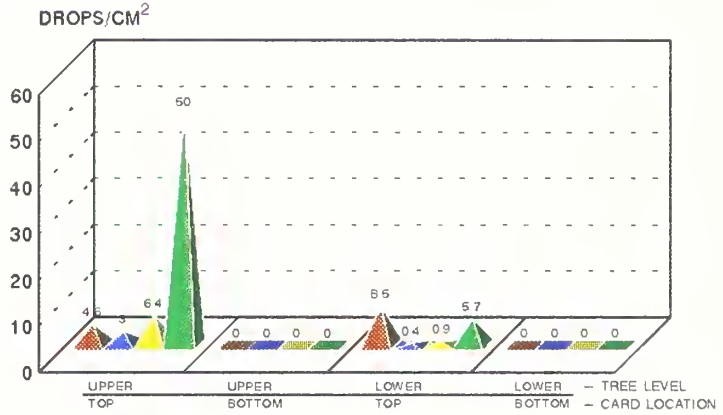
Figure 47

AIRCRAFT - DAY 1
TREE LINE 2 - TREE 1



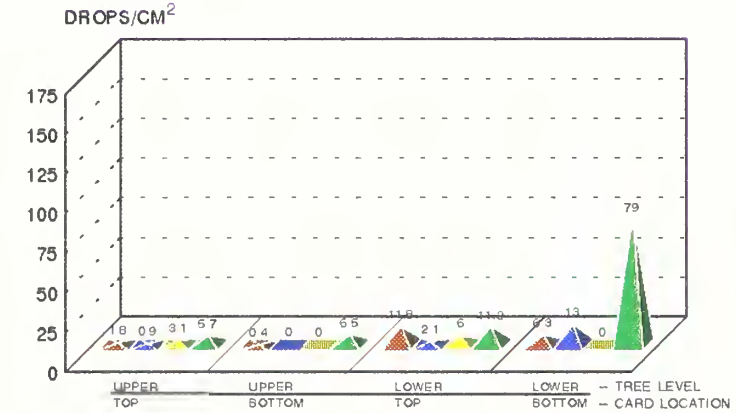
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 1
TREE LINE 2 - TREE 2



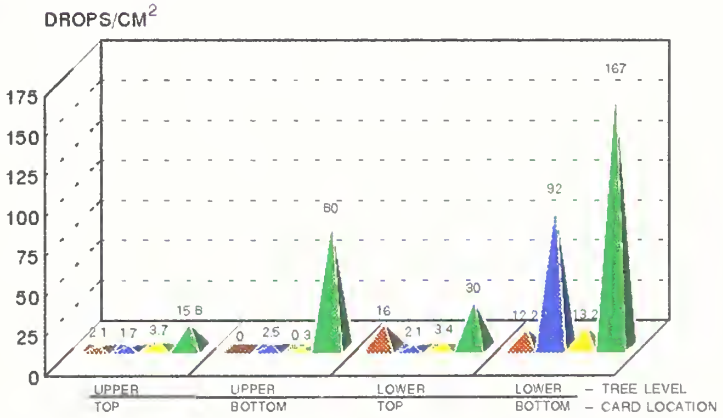
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 1
TREE LINE 2 - TREE 1



AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 1
TREE LINE 2 - TREE 2

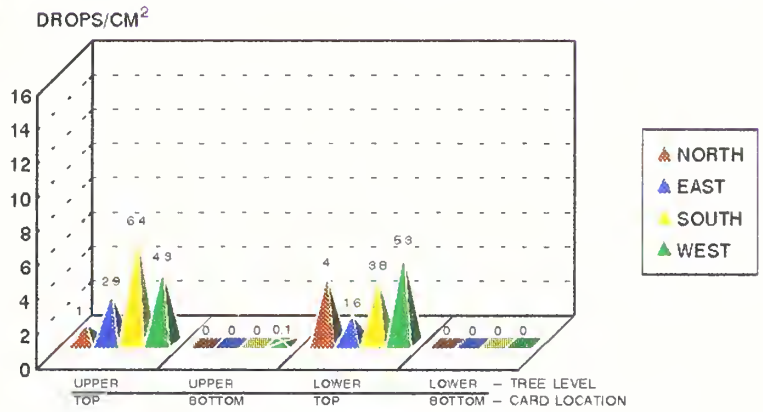


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

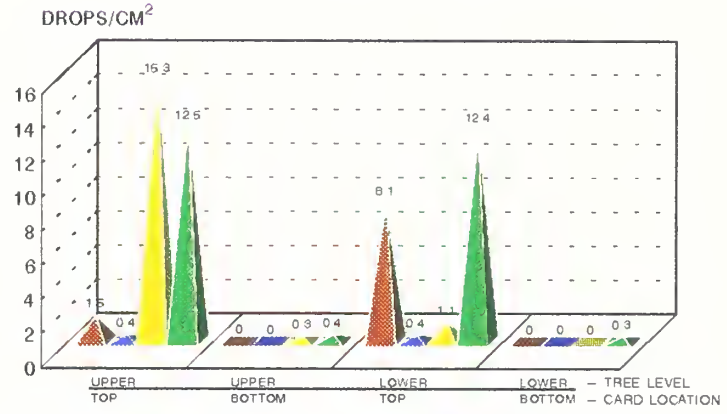
Figure 48

AIRCRAFT - DAY 1
TREE LINE 3 - TREE 1



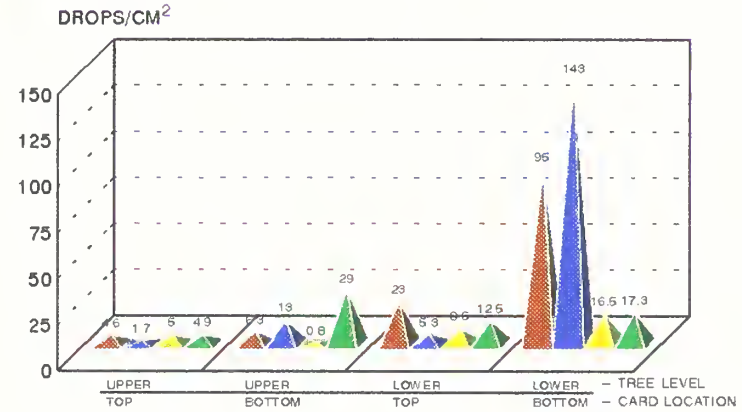
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 1
TREE LINE 3 - TREE 2



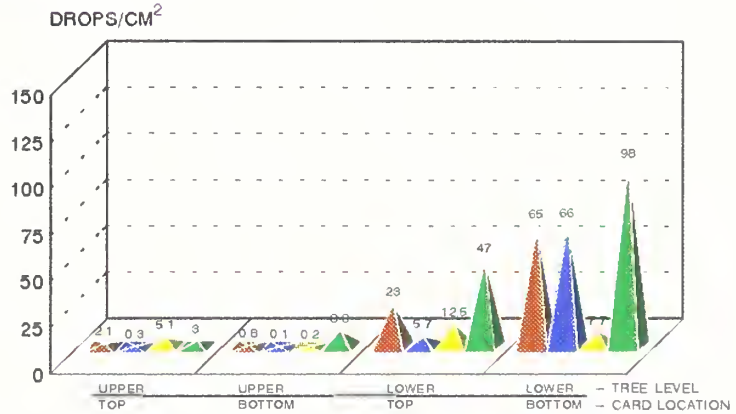
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 1
TREE LINE 3 - TREE 1



AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 1
TREE LINE 3 - TREE 2

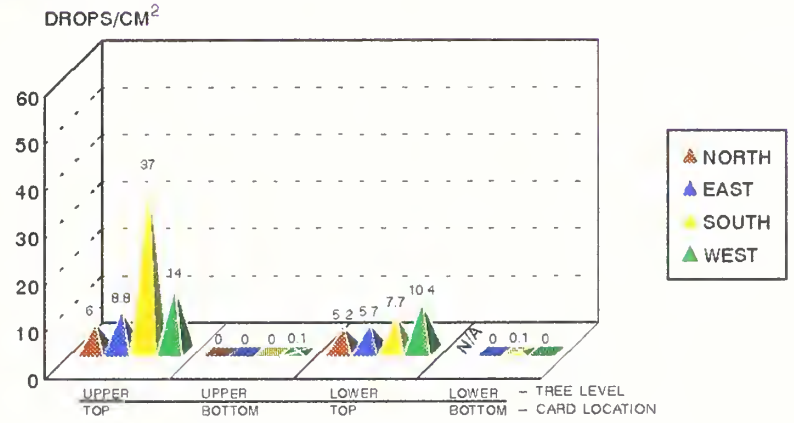


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

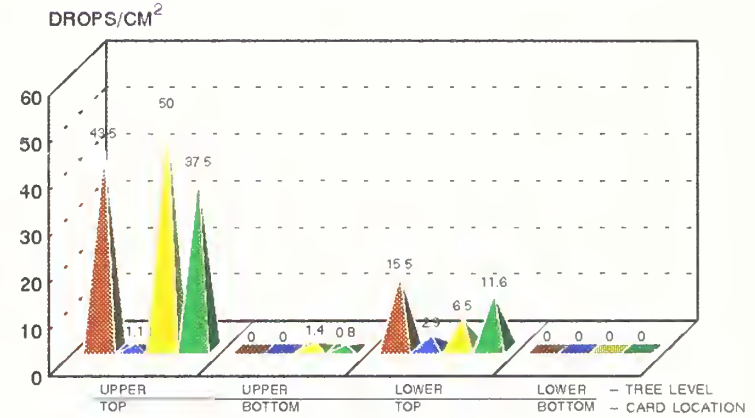
Figure 49

AIRCRAFT - DAY 1
TREE LINE 4 - TREE 1



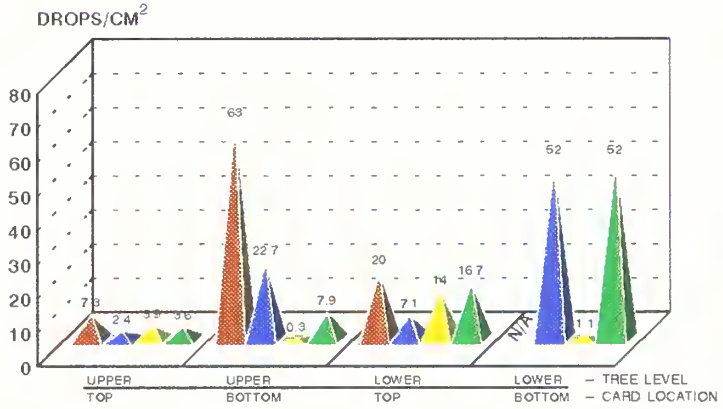
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 1
TREE LINE 4 - TREE 2



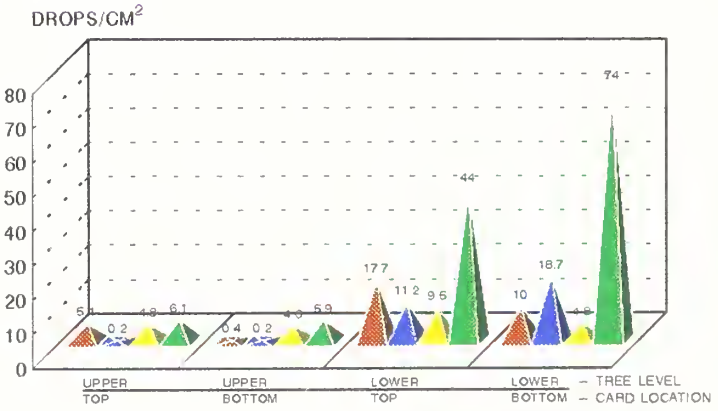
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 1
TREE LINE 4 - TREE 1



AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 1
TREE LINE 4 - TREE 2

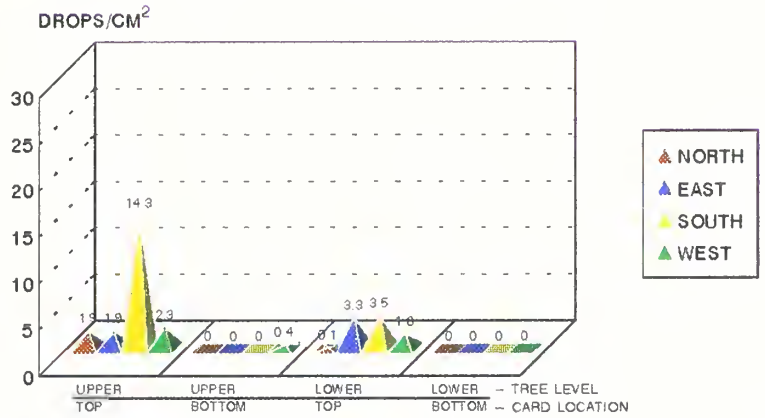


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

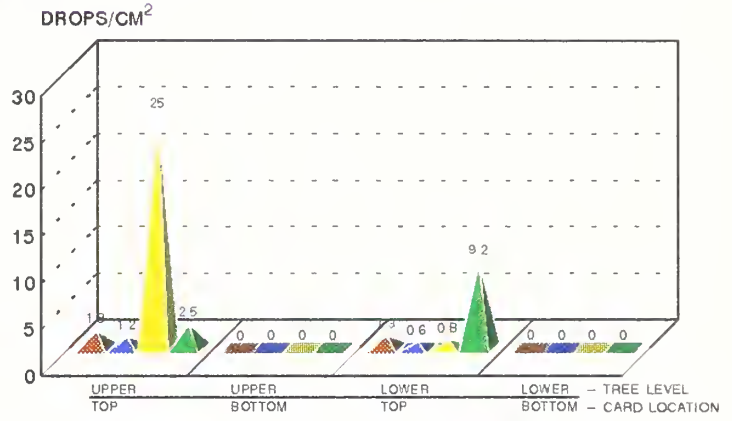
Figure 50

AIRCRAFT - DAY 1
TREE LINE 5 - TREE 1



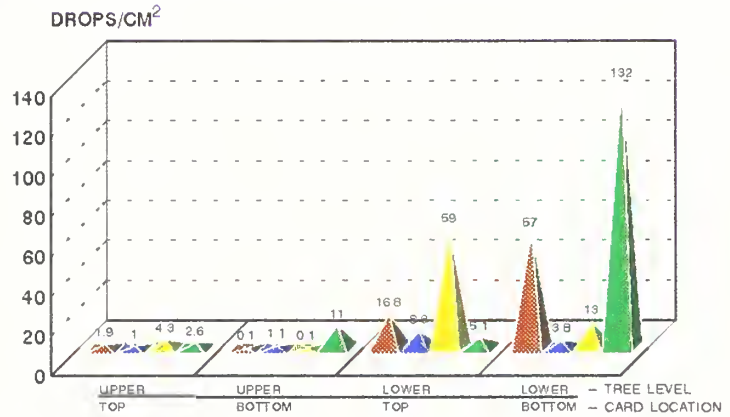
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 1
TREE LINE 5 - TREE 2



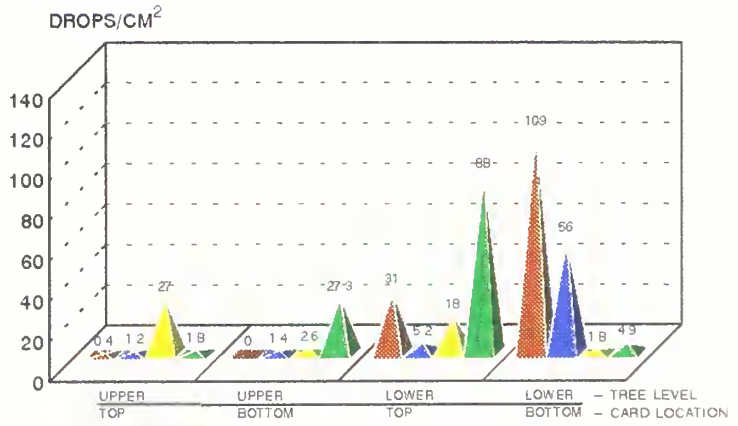
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 1
TREE LINE 5 - TREE 1



AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 1
TREE LINE 5 - TREE 2

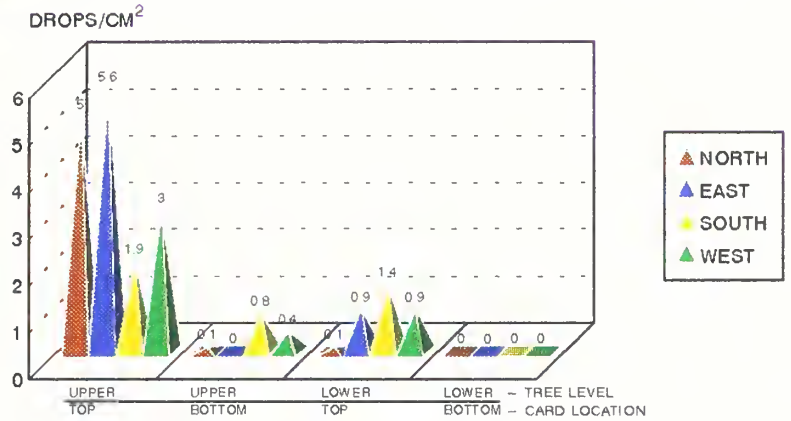


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

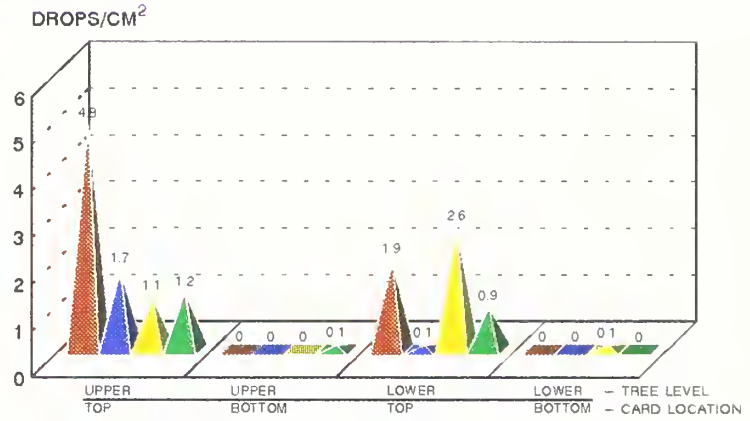
Figure 51

AIRCRAFT - DAY 1
TREE LINE 6 - TREE 1



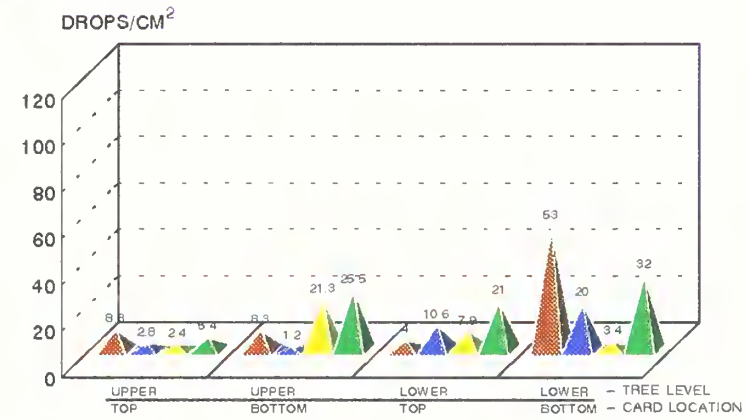
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 1
TREE LINE 6 - TREE 2



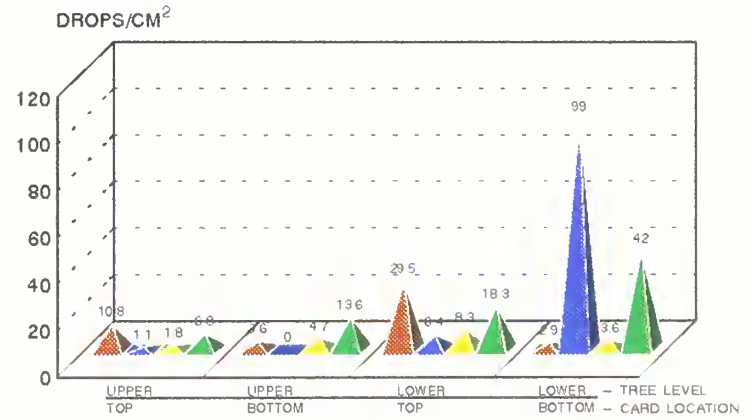
AUGUST 20, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 1
TREE LINE 6 - TREE 1



AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 1
TREE LINE 6 - TREE 2

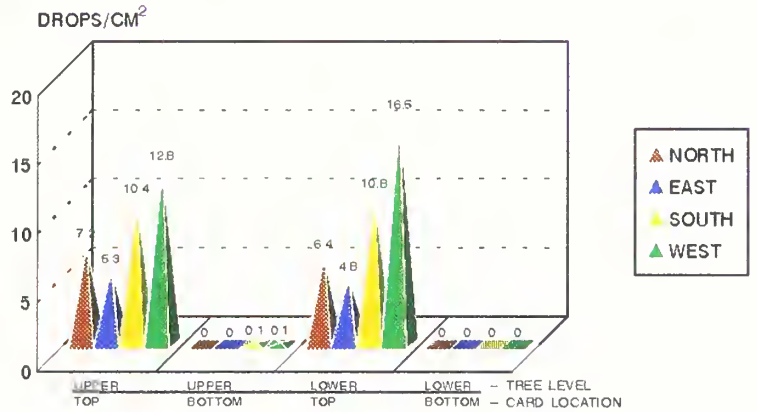


AUGUST 20, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

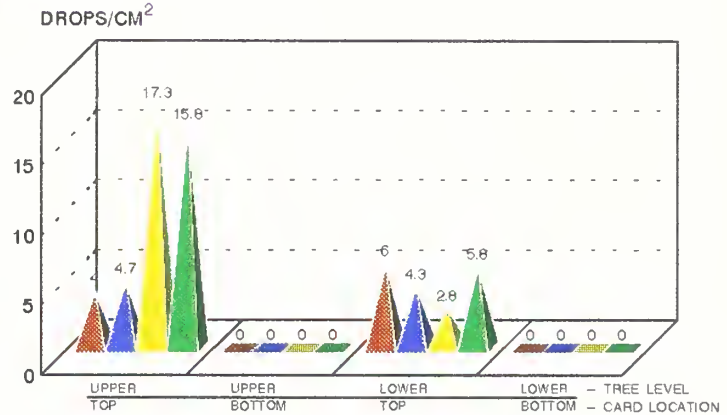
Figure 52

AIRCRAFT - DAY 2
TREE LINE 1 - TREE 1



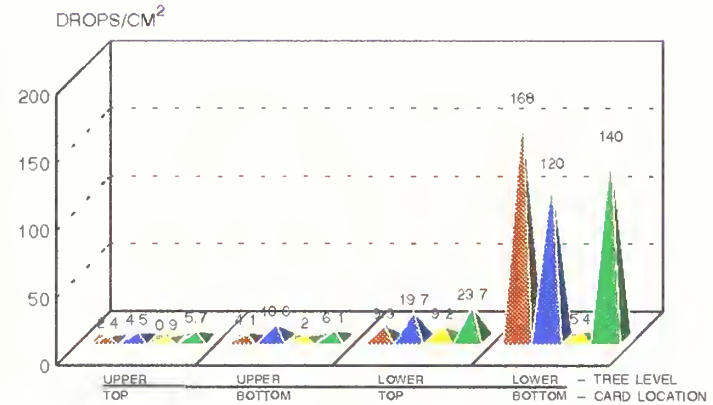
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 2
TREE LINE 1 - TREE 2



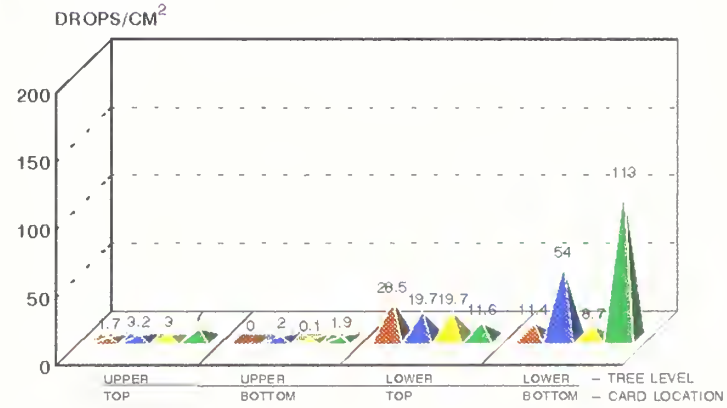
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 2
TREE LINE 1 - TREE 1



AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 2
TREE LINE 1 - TREE 2

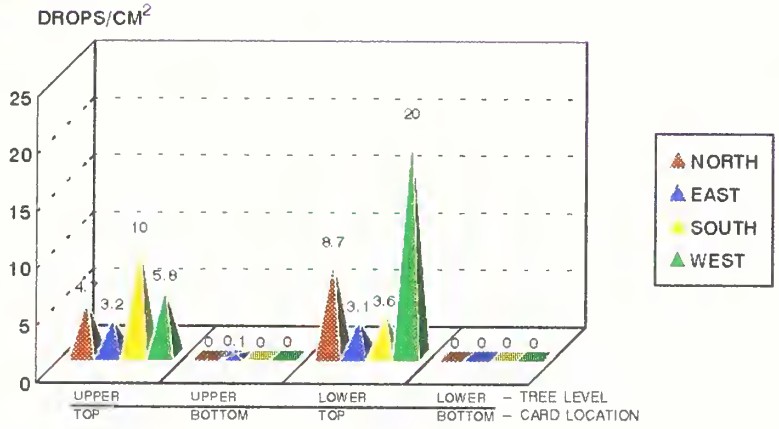


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

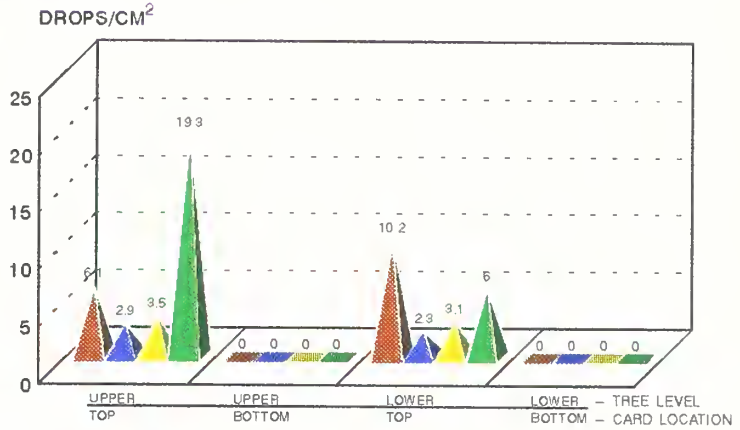
Figure 53

AIRCRAFT - DAY 2
TREE LINE 2 - TREE 1



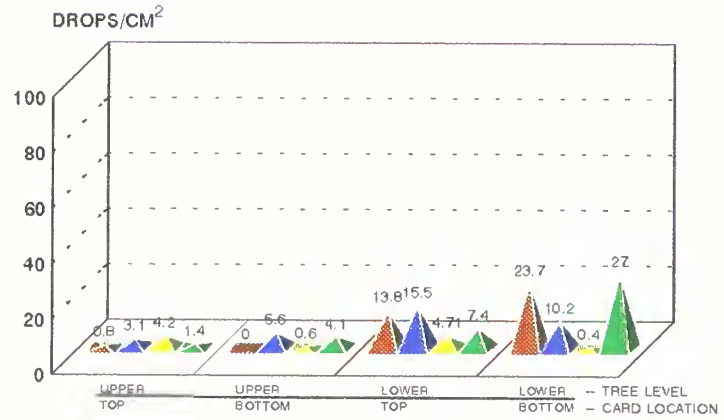
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 2
TREE LINE 2 - TREE 2



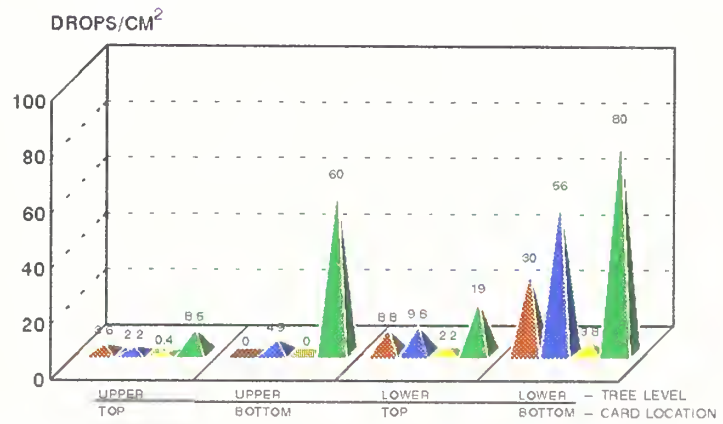
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 2
TREE LINE 2 - TREE 1



AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 2
TREE LINE 2 - TREE 2

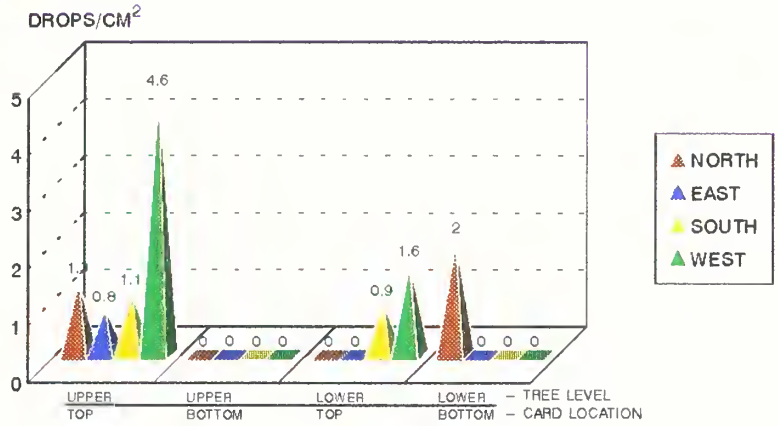


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

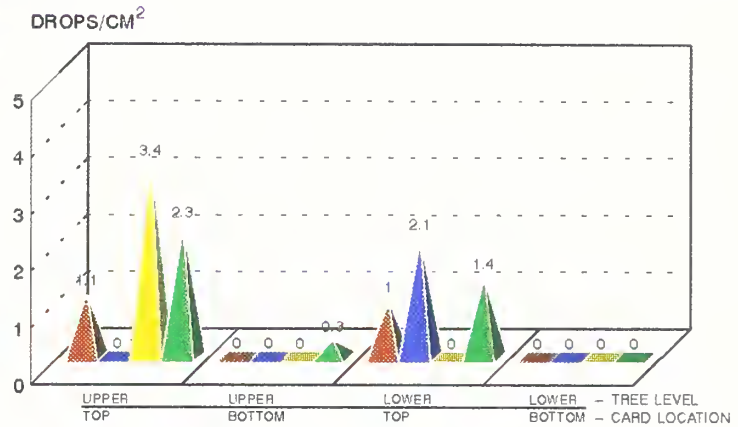
Figure 54

AIRCRAFT - DAY 2
TREE LINE 3 - TREE 1



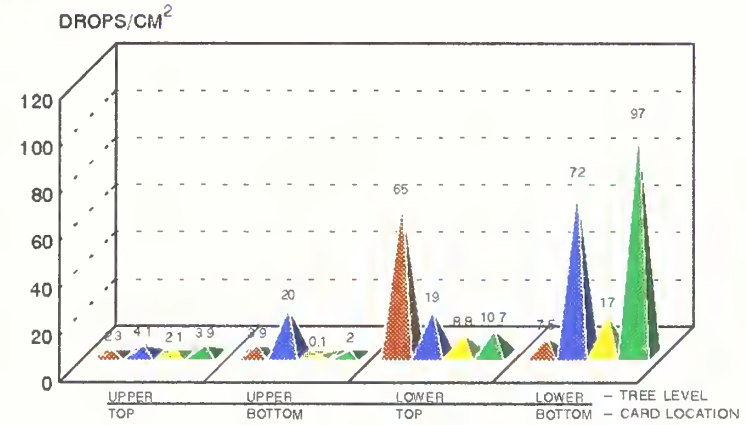
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 2
TREE LINE 3 - TREE 2



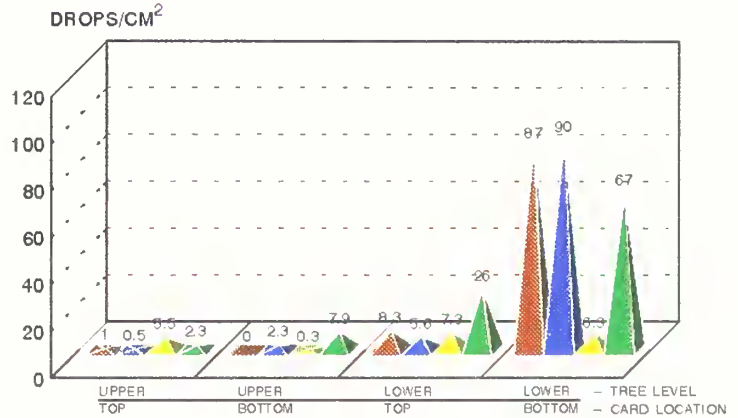
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 2
TREE LINE 3 - TREE 1



AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 2
TREE LINE 3 - TREE 2

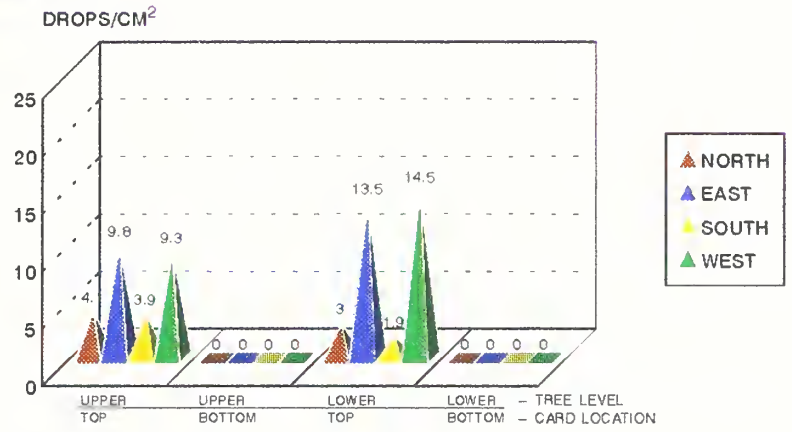


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

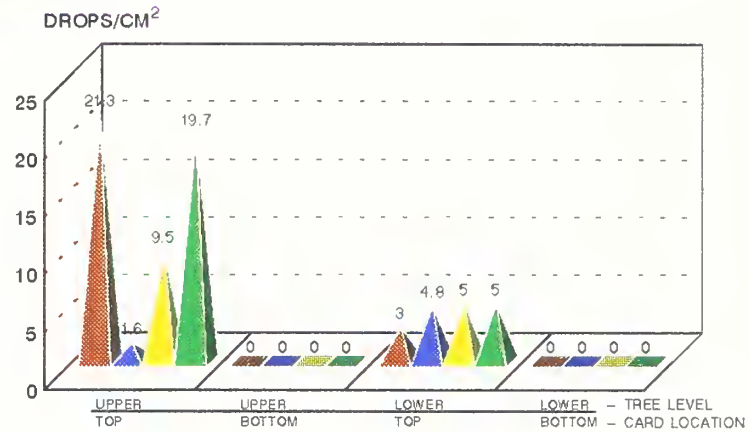
Figure 55

AIRCRAFT - DAY 2
TREE LINE 4 - TREE 1



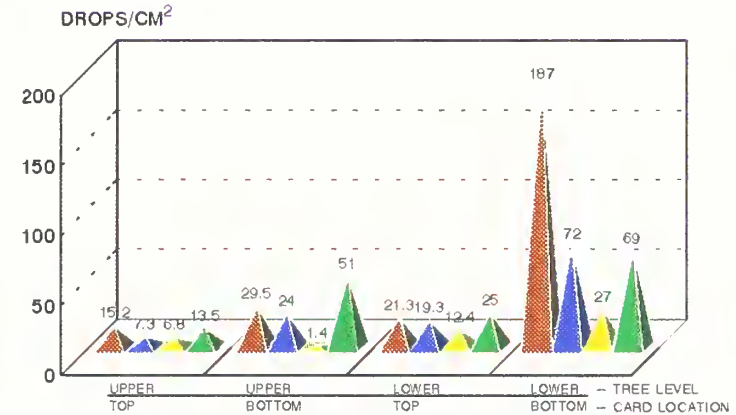
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 2
TREE LINE 4 - TREE 2



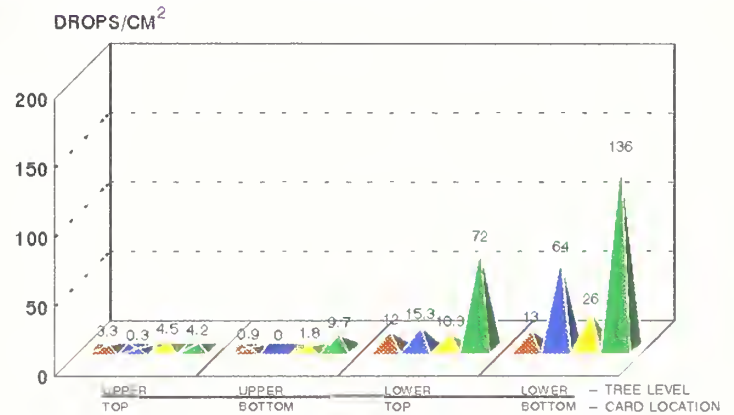
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 2
TREE LINE 4 - TREE 1



AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 2
TREE LINE 4 - TREE 2

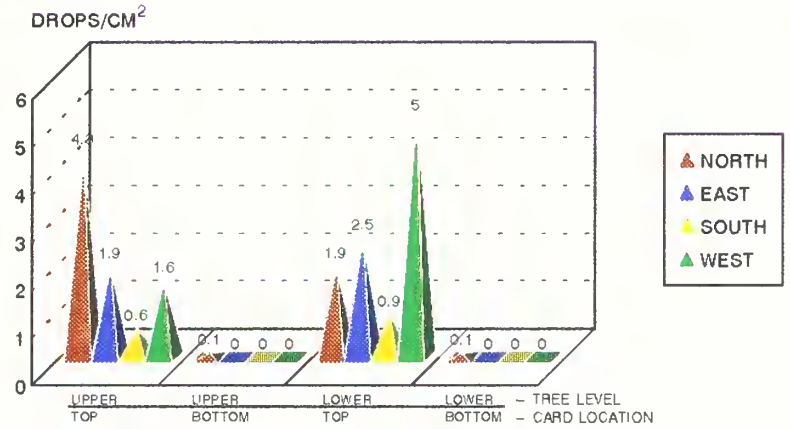


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

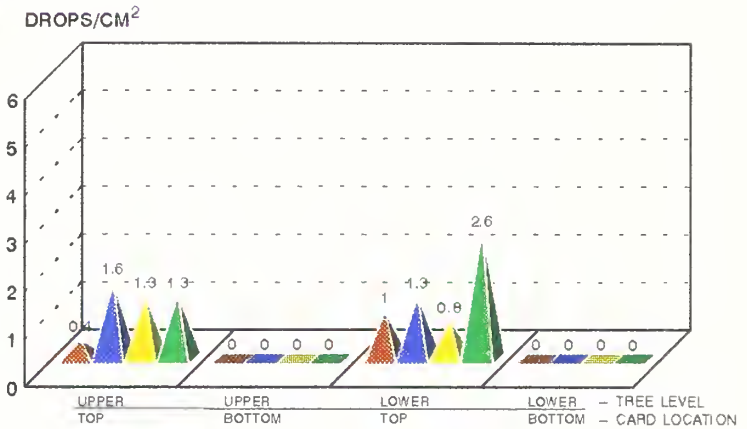
Figure 56

AIRCRAFT - DAY 2
TREE LINE 5 - TREE 1



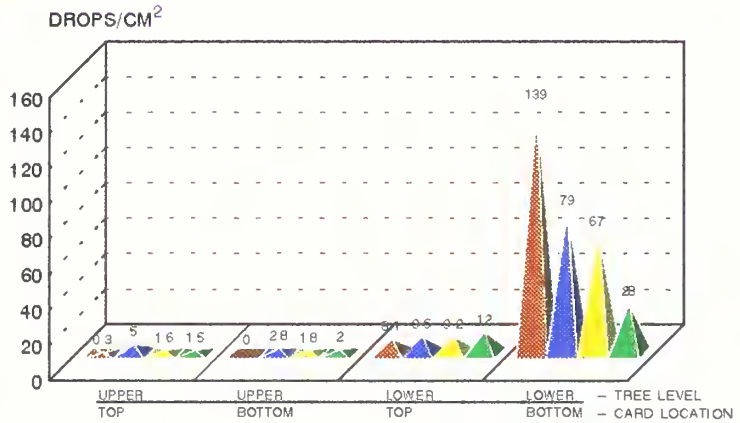
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 2
TREE LINE 5 - TREE 2



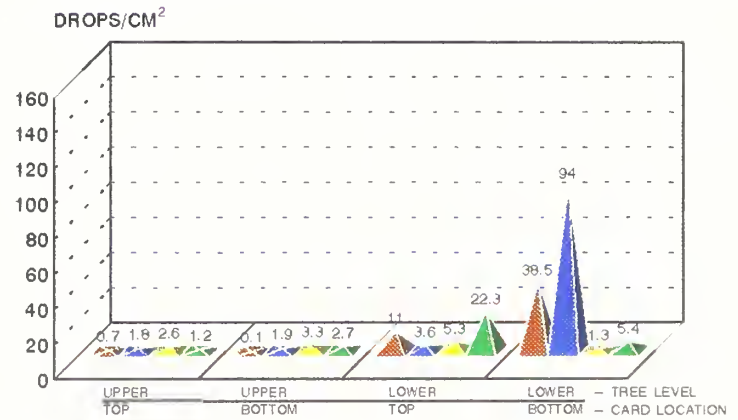
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 2
TREE LINE 5 - TREE 1



AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 2
TREE LINE 5 - TREE 2

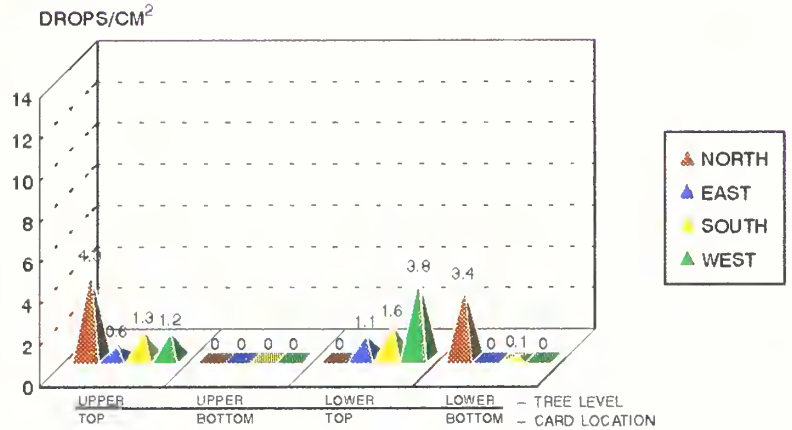


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

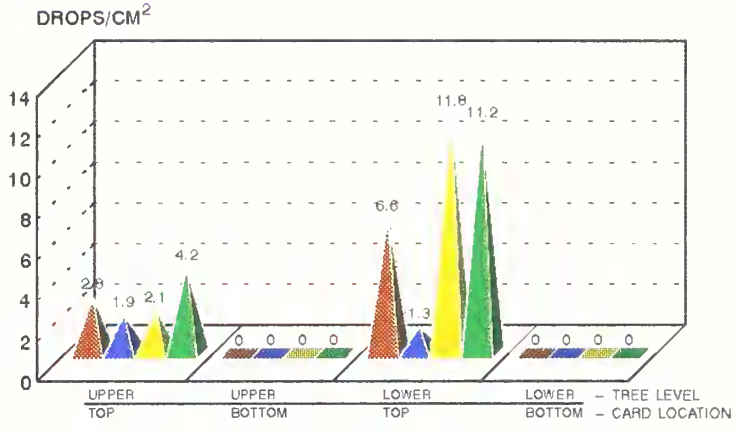
Figure 57

AIRCRAFT - DAY 2
TREE LINE 6 - TREE 1



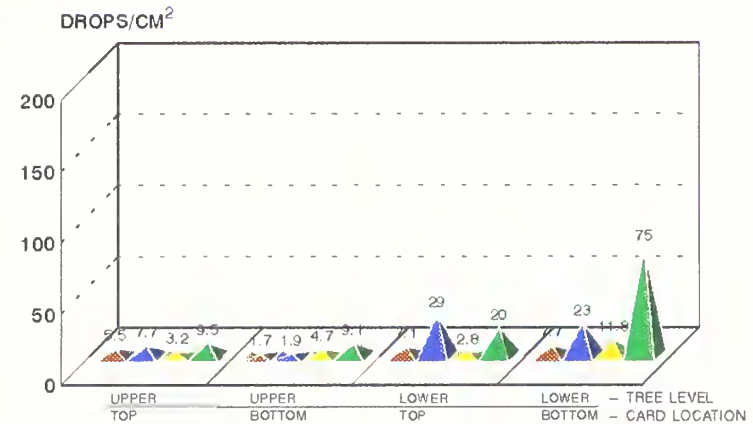
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 2
TREE LINE 6 - TREE 2



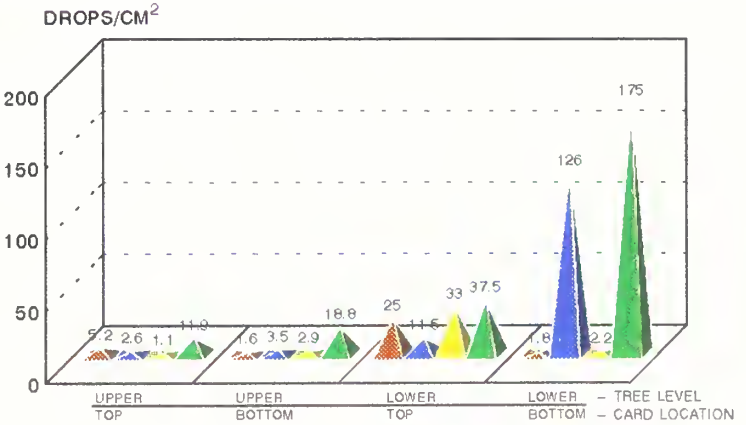
AUGUST 21, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 2
TREE LINE 6 - TREE 1



AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 2
TREE LINE 6 - TREE 2

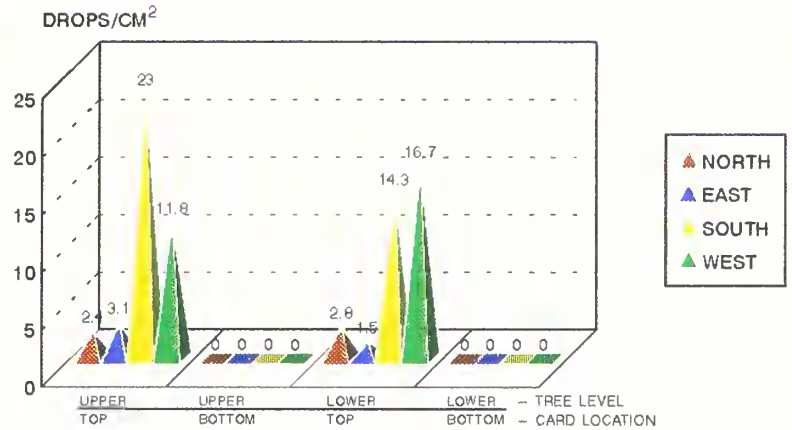


AUGUST 21, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

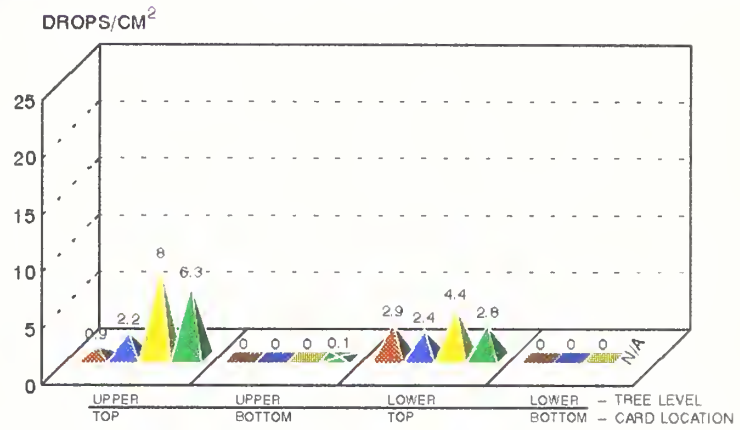
Figure 58

AIRCRAFT - DAY 3
TREE LINE 1 - TREE 1



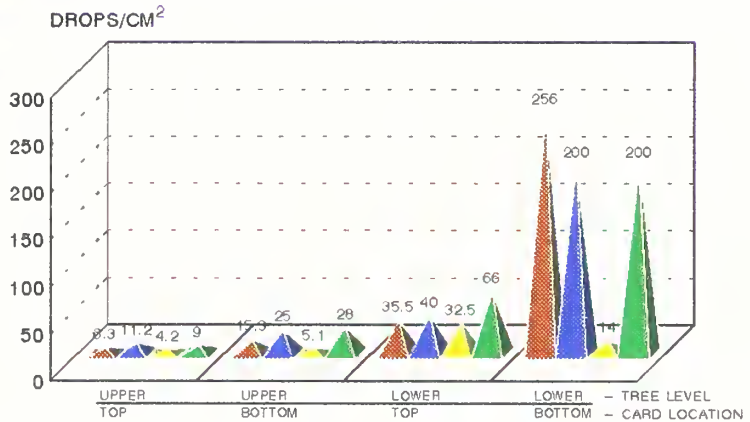
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 3
TREE LINE 1 - TREE 2



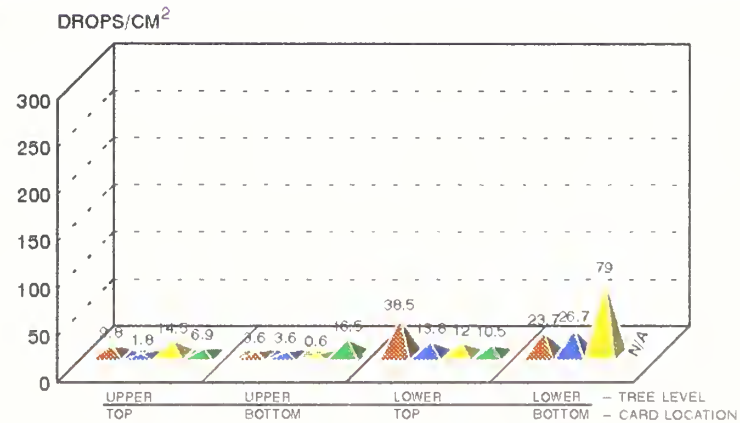
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 3
TREE LINE 1 - TREE 1



AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 3
TREE LINE 1 - TREE 2

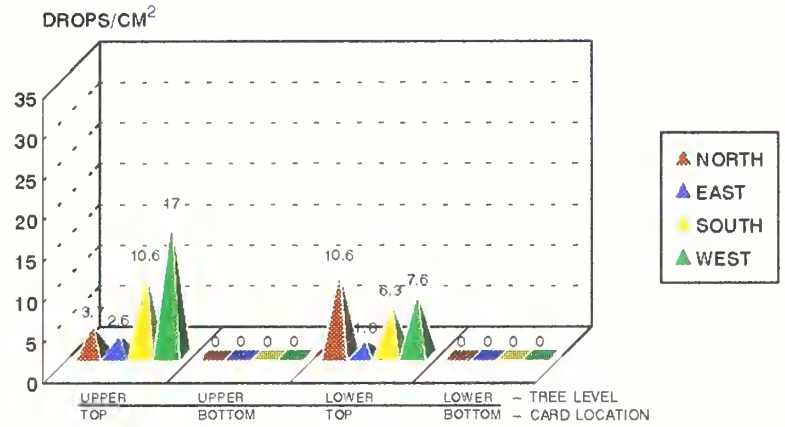


AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

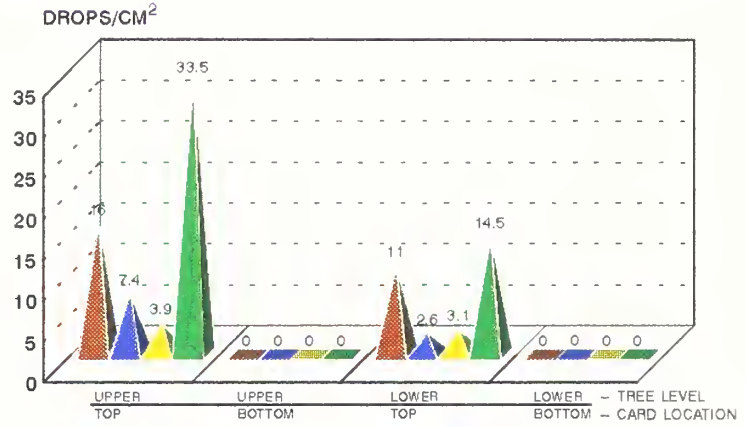
Figure 59

AIRCRAFT - DAY 3
TREE LINE 2 - TREE 1



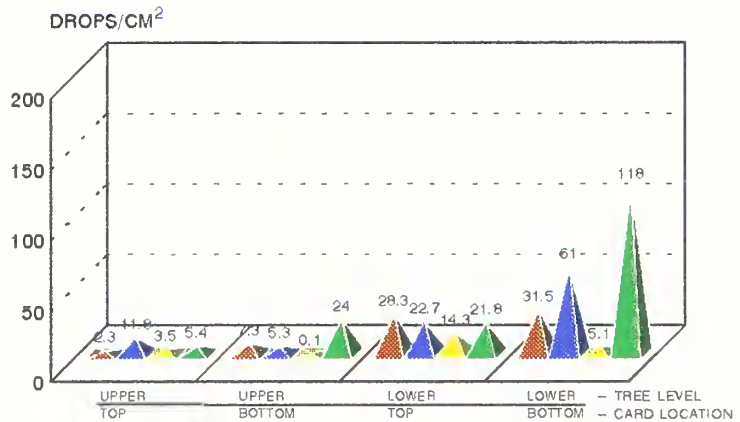
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 3
TREE LINE 2 - TREE 2



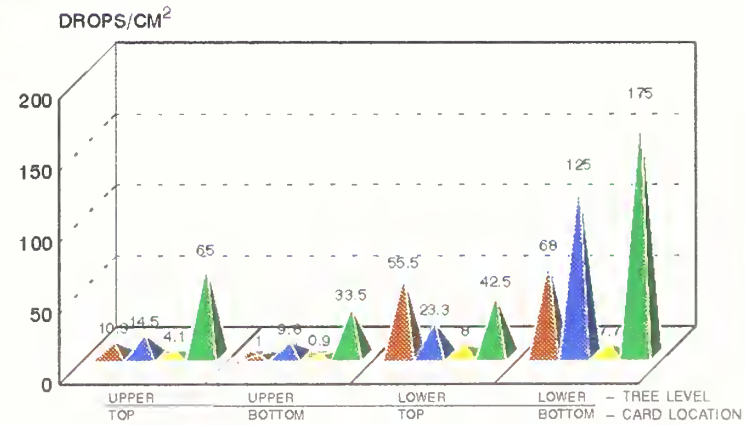
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 3
TREE LINE 2 - TREE 1



AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 3
TREE LINE 2 - TREE 2

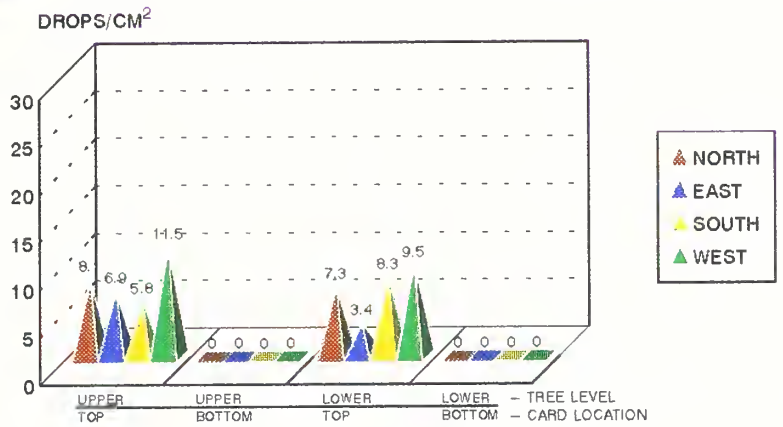


AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

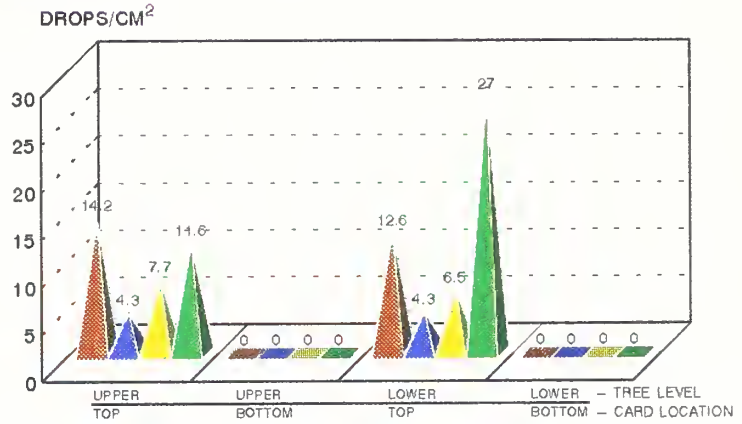
Figure 60

AIRCRAFT - DAY 3
TREE LINE 3 - TREE 1



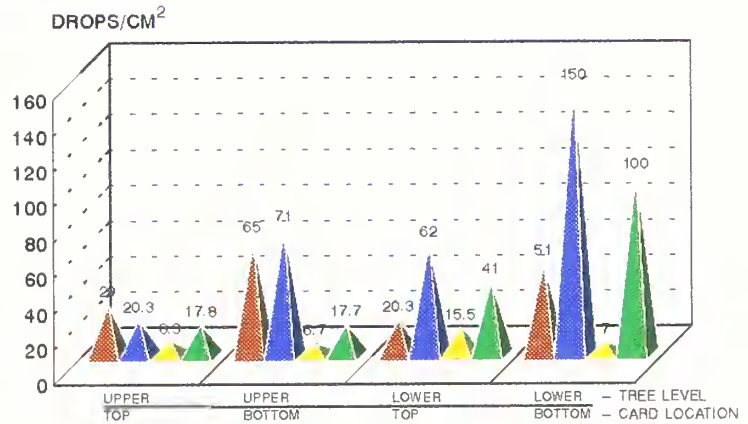
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 3
TREE LINE 3 - TREE 2



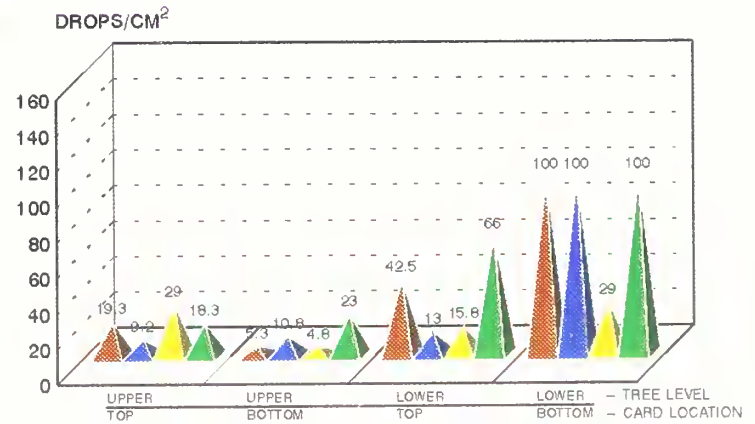
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 3
TREE LINE 3 - TREE 1



AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 3
TREE LINE 3- TREE 2

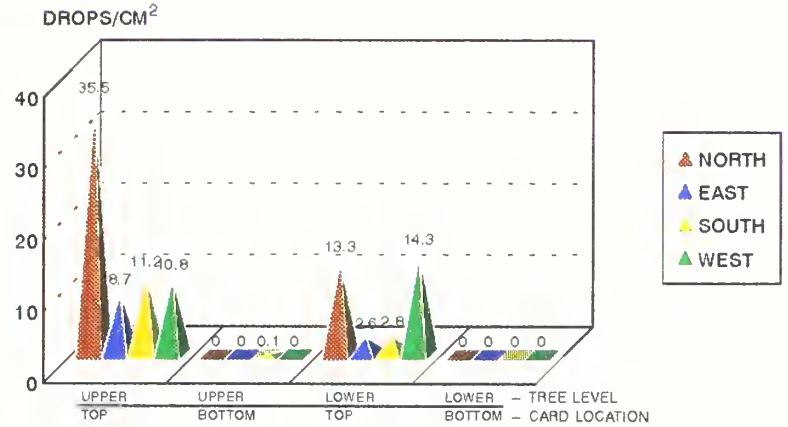


AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

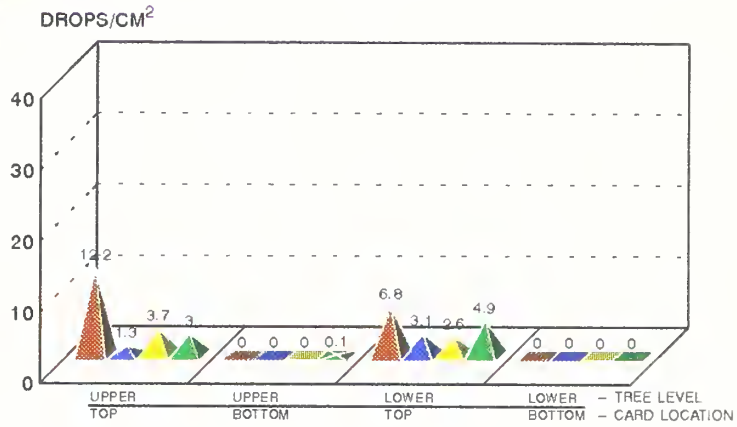
Figure 61

AIRCRAFT - DAY 3
TREE LINE 4 - TREE 1



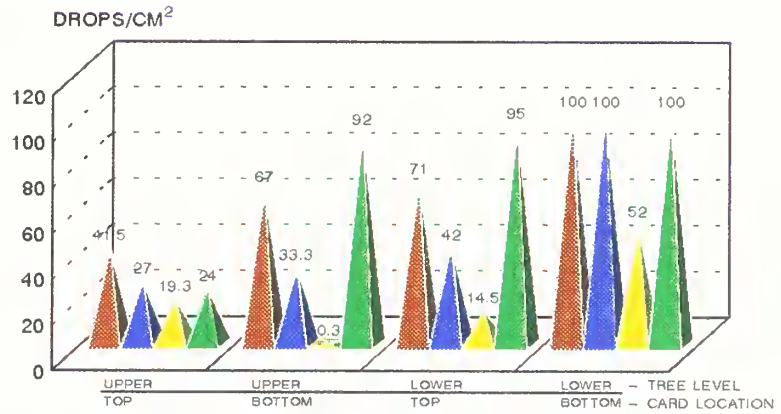
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 3
TREE LINE 4 - TREE 2



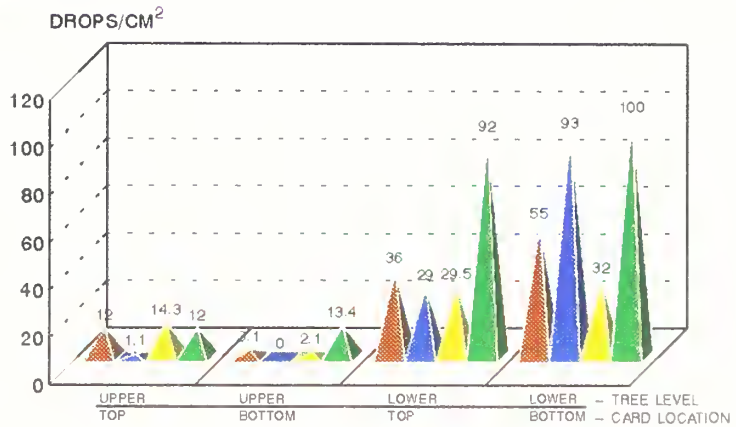
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 3
TREE LINE 4 - TREE 1



AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 3
TREE LINE 4 - TREE 2

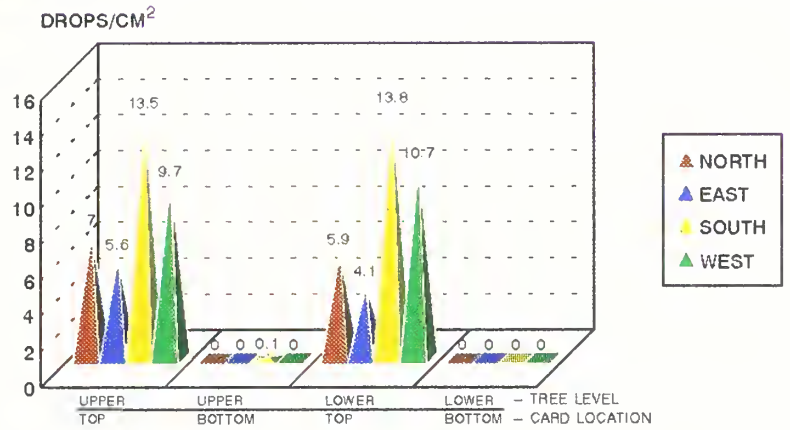


AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

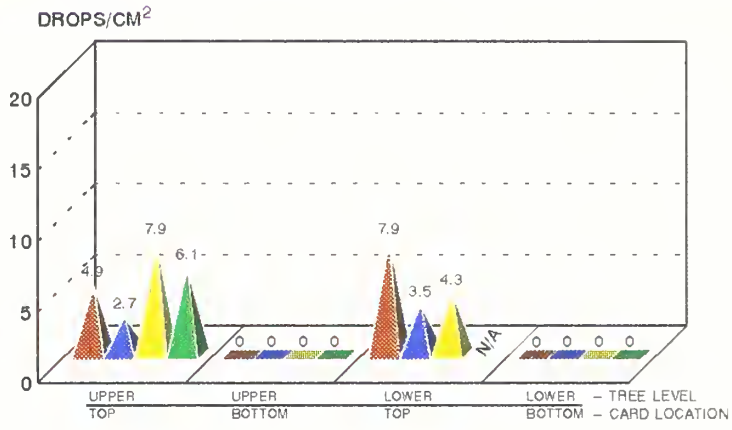
Figure 62

AIRCRAFT - DAY 3
TREE LINE 5 - TREE 1



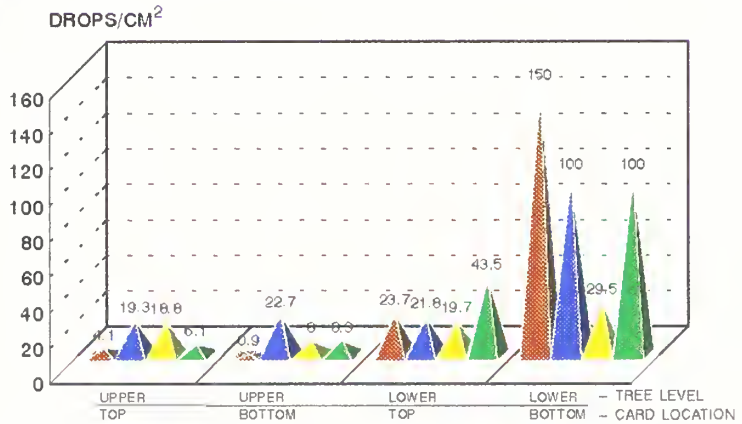
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 3
TREE LINE 5 - TREE 2



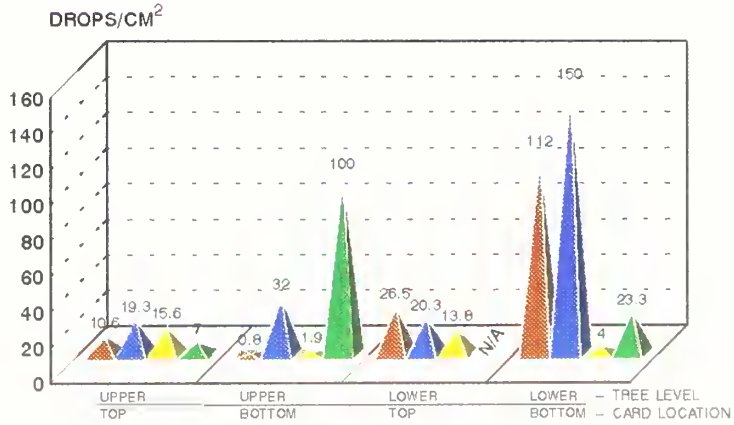
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 3
TREE LINE 5 - TREE 1



AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 3
TREE LINE 5 - TREE 2

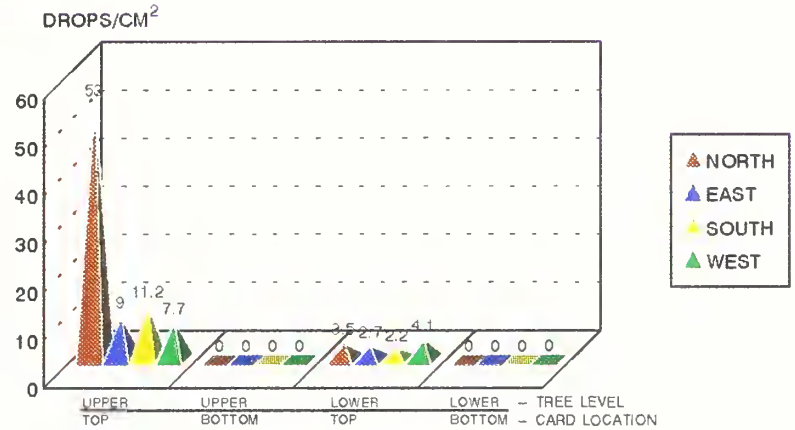


AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

CLAXTON SPRAY TRIALS
QUADRANT DEPOSITION
AUGUST 1991

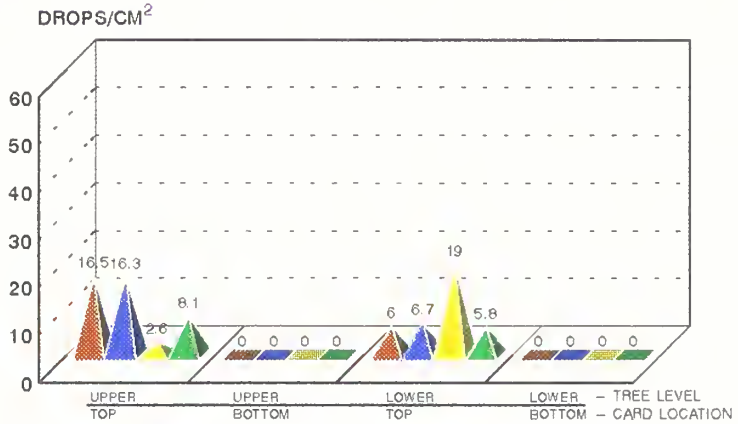
Figure 63

AIRCRAFT - DAY 3
TREE LINE 6 - TREE 1



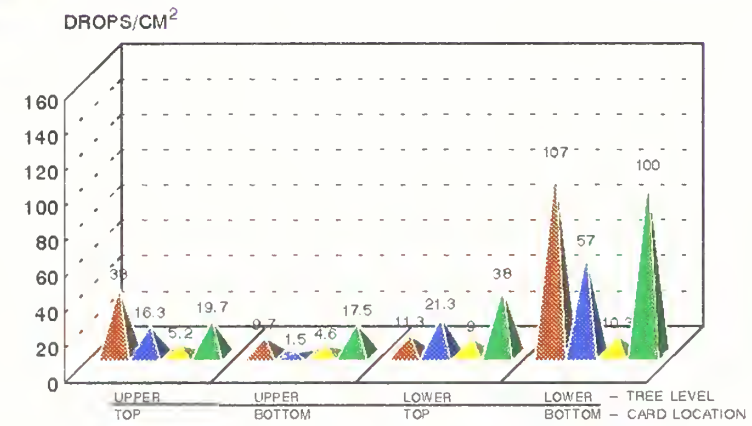
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

AIRCRAFT - DAY 3
TREE LINE 6 - TREE 2



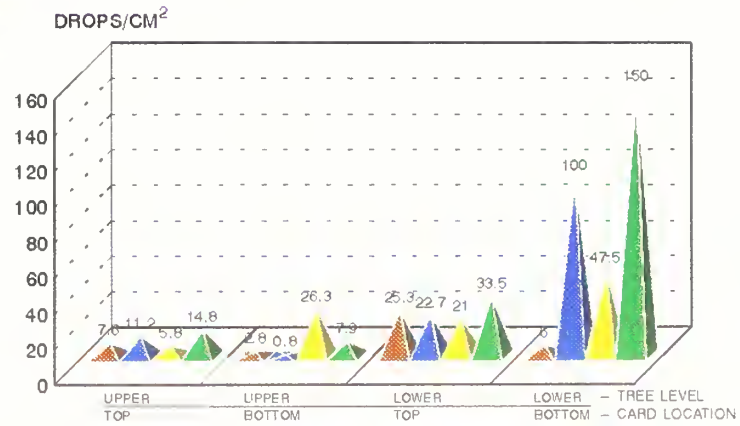
AUGUST 22, 1991
AIRCRAFT RATE = 1.2 gal/acre

GROUND - DAY 3
TREE LINE 6 - TREE 1



AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre

GROUND - DAY 3
TREE LINE 6 - TREE 2



AUGUST 22, 1991
GROUND SPRAYER RATE = 2.9 gal/acre